# SAFETY PRECAUTIONS

## SERVICE WARNING

Only qualified service technicians who are familiar with safety checks and guidelines should perform service work. Before replacing parts, disconnect power source to protect electrostatically sensitive parts. Do not attempt to modify any circuit unless so recommended by the manufacturer. When servicing the receiver, use an isolation transformer between the line cord and power receptacle.

## SERVICING THE HIGH VOLTAGE AND CRT

Use EXTREME CAUTION when servicing the high voltage circuits. To discharge static high voltage, connect a 10K ohms resistor in series with a test lead between the receiver and CRT anode lead. DO NOT lift the CRT by the neck. Always wear shatterproof goggles when handling the CRT to protect eyes in case of implosion.

## X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Be aware of the instructions and procedures covering X-ray radiation. In solid-state receivers and monitors, the CRT is the only potential source of X-rays. Keep an accurate high voltage meter available at all times. Check meter calibration periodically. Whenever servicing a receiver, check the high voltage at various brightness levels to be sure it is regulating properly. Keep high voltage at rated value, NO HIGHER. Excessive high voltage may cause X-ray radiation or failure of associated components. DO NOT depend on protection circuits to keep voltage at rated value. When troubleshooting a receiver with excessive high voltage, avoid close contact with the CRT. DO NOT operate the receiver longer than necessary. To locate the cause of excessive high voltage, use a variable AC transformer to regulate voltage. In present receivers, many electrical and mechanical components have safety related characteristics which are not detectable by visual inspection. Such components are identified by a # on both the schematic and the parts list. For SAFETY, use only equivalent replacement parts when replacing these components.

## GENERAL GUIDELINES

Perform a final SAFETY CHECK before returning receiver to customer. Check repaired area for poorly soldered connections, and check entire circuit board for solder splashes. Check inner board wiring for pinched wires or wires contacting any high wattage resistors. Check that all control knobs, shields, covers, grounds, and mounting hardware have been replaced. Be sure to replace all insulators and restore proper lead dress.

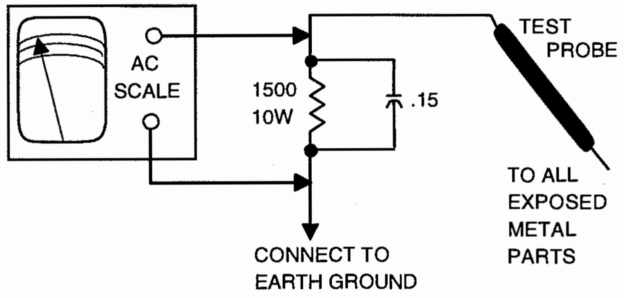
## SAFETY CHECKS -- FIRE AND SHOCK HAZARD

### Cold Leakage Checks for Receivers with Isolated Ground

Unplug the AC cord, connect a jumper across the plug prongs, and turn the power switch on (if applicable). Use an ohmmeter to measure the resistance between the jumped AC plug and any exposed metal cabinet parts such as antenna screw heads, control shafts, or handle brackets. Exposed metal parts with a return path should measure between 1M ohms and 5.2M ohms. Parts without a return path must measure infinity.

### Hot Leakage Current Check

Plug the AC cord directly into an AC outlet. DO NOT use an isolation transformer. Use a 1500 ohms, 10W resistor in parallel with a .15µF capacitor to connect between any exposed metal parts on the receiver and a good earth ground. (See figure below.) Use an AC voltmeter with at least 5000 ohms per volt sensitivity to measure the voltage across the resistor. Check all exposed metal parts and measure voltage at each point. Voltage measurements should not exceed .75VAC, 500µA. Any value exceeding this limit constitutes a potential shock hazard and must be corrected. If the AC plug is not polarized, reverse the AC plug and repeat exposed metal part voltage measurement at each point.



## TEST JIG HOOKUP

| Function | Chek-A-Color Adapter No. | PC Board Plug No. | Pin | Color |
|---|---|---|---|---|
| CRT | B239 | P401 | 7 | Red |
| Yoke | D4137 | | 8 | Blue |
| Yoke Setting | YP1 | | 9 | Yellow |
| Comments | Focus Tap | | 10 | Green |

## HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC and turn receiver on. Set all digital customer controls for normal operation. Momentarily short test point X to test point R. Receiver should lose raster and sound. If the receiver does not lose raster and sound, the shutdown circuit should be repaired. To resume normal operation, remove AC power and wait 30 seconds. After restoring AC power, the receiver should power up automatically.

The listing of any available replacement part herein in no case constitutes a recommendation, warranty, or guarantee by Howard W. Sams & Company as to the quality and suitability of such replacement part. The numbers of the listed parts have been compiled from information furnished to Howard W. Sams & Company by the manufacturers of the specific type of replacement part listed.

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A Bell Atlantic Company
2647 Waterfront Parkway East Drive, Suite 100
Indianapolis, IN 46214-2041

*Printed in the United States of America 5 4 3 2 1*

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SET 4001

MODEL CN32G90 (CHASSIS TAC9723)

TOSHIBA

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# PHOTOFACT® Technical Service Data

4001

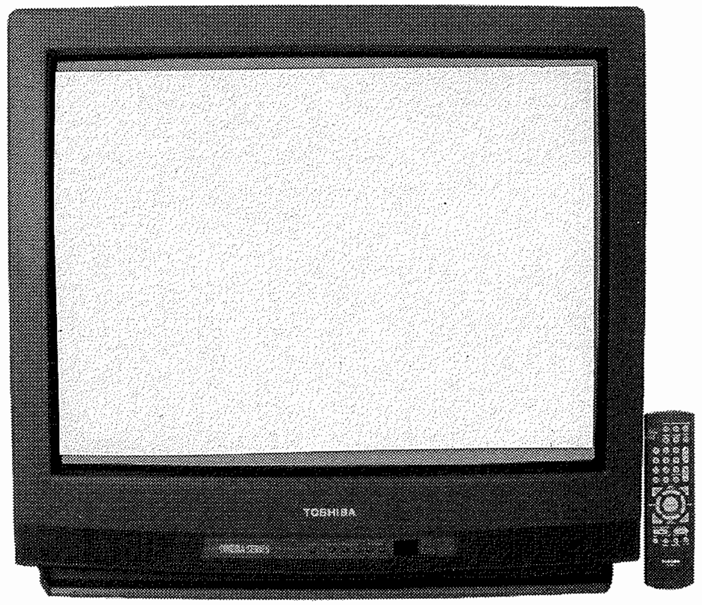
INDEX

High Voltage Shutdown Test ....... 1
IC Functions .................... 1
Important Parts Information ........ 1
Miscellaneous Adjustments ......... 1
Parts List ....................... 4
Placement Chart ................. 4
*Safety Precautions* ............. 1
Schematic Component Location ..... 3
Schematic Notes ................. 1
Schematics
  Audio/PIP ................. 3
  Power Supply .............. 2
  System Control ............ 3
  Television ................ 2
  Velocity Modulator ......... 2
Test Equipment .................. 1
Test Jig Hookup ................ 1
Tuner Information ............... 1

For Supplier Address,
See PHOTOFACT Annual Index

## TOSHIBA

**Model CN32G90 (Chassis TAC9723)**



**Essential coverage for servicing a television receiver...**

- **Schematics**
- **Component locations**
- **Parts list**

*Coverage includes this additional model and chassis:*

| MODEL | CHASSIS |
|---|---|
| CN36G95 | TAC9724 |

HOWARD W. SAMS & COMPANY

JULY 1998 SET 4001

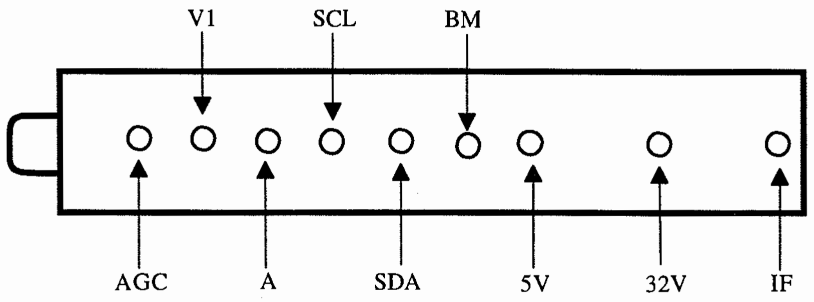
# TUNER INFORMATION

## H001 MAIN TUNER VOLTAGE CHART

| Pin | VHF Low Band | VHF High Band | UHF Band | Pin | VHF Low Band | VHF High Band | UHF Band |
|---|---|---|---|---|---|---|---|
| 1 (AGC) | 4.1V | 4.9V | 4.4V | 8 (+32V) | 32.4V | 32.4V | 32.4V |
| 2 (V1) | 1.0V | 4.5V | 5.1V | 9 (IF) | 0V | 0V | 0V |
| 3 (A) | 5.2V | 5.2V | 5.2V | | | | |
| 4 (SCL) | 4.5V | 4.5V | 4.5V | | | | |
| 5 (SDA) | 4.7V | 4.7V | 4.7V | | | | |
| 6 (BM) | 9.2V | 9.2V | 9.2V | | | | |
| 7 (+5V) | 5.0V | 5.0V | 5.0V | | | | |

NOTE: VHF Low Band voltages taken on channel 2.
VHF High Band voltages taken on channel 7.
UHF Band voltages taken on channel 14.

## H001 MAIN TUNER TERMINAL GUIDE

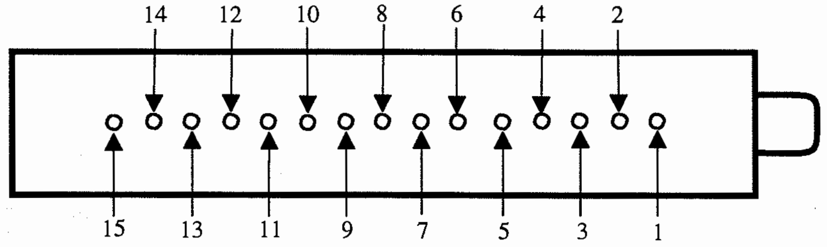


## HY01 PIP TUNER VOLTAGE CHART

| Pin | VHF Low Band | VHF High Band | UHF Band | Pin | VHF Low Band | VHF High Band | UHF Band |
|---|---|---|---|---|---|---|---|
| 1 (NC) | 0V | 0V | 0V | 10 (A OUT) | 0V | 0V | 0V |
| 2 (+32V) | 32.4V | 32.4V | 32.4V | 11 (GND) | 0V | 0V | 0V |
| 3 (SCL) | 4.5V | 4.5V | 4.5V | 12 (AFT) | 2.5V | 1.6V | 3.9V |
| 4 (SDA) | 4.7V | 4.7V | 4.7V | 13 (NC) | 0V | 0V | 0V |
| 5 (NC) | 0V | 0V | 0V | 14 (GND) | 0V | 0V | 0V |
| 6 (ADS) | 0V | 0V | 0V | 15 (V OUT) | 5.2V | 4.5V | 4.5V |
| 7 (+5V) | 5.0V | 5.0V | 5.0V | | | | |
| 8 (AGC) | 7.1V | 4.4V | 3.7V | | | | |
| 9 (9V) | 9.0V | 9.0V | 9.0V | | | | |

NOTE: VHF Low Band voltages taken on channel 2.
VHF High Band voltages taken on channel 7.
UHF Band voltages taken on channel 14.

## HY01 PIP TUNER TERMINAL GUIDE



# MISCELLANEOUS ADJUSTMENTS

## HIGH VOLTAGE CHECK

Tune in a picture. Set brightness, contrast, and color to minimum. Connect a high voltage probe to the CRT anode. High voltage should read 30kV to 32kV.

## ENTERING THE SERVICE AND DESIGN MODES

To enter the service mode, press the mute button on the remote. Press the mute button again and keep pressing while simultaneously pressing the menu button on the receiver. The letter S will appear on the screen indicating that the receiver is in the service mode.

To enter the design mode, enter the service mode and press and hold the recall button while simultaneously pressing the menu button on the receiver. The letter D will appear on the screen indicating that the receiver is in the design mode.

When in the service mode or design mode, press the menu button on the receiver to display the adjustment menu. To select the item to be adjusted, press the channel up or down button. To adjust the reference value, press the volume up or down button. To exit from the service mode or the design mode, press the power button to turn off the receiver.

## TEST SIGNAL SELECTION

Enter the service mode. Press the menu button on the receiver to display the adjustment menu. Press the TV/video button on the remote to display the built-in test patterns in the following order:

Normal picture, red raster, green raster, blue raster, black screen, white screen, black screen with white window, black crossbar, white crossbar, black crosshatch, white crosshatch, black crossdot, white crossdot, and back to normal picture.

NOTE: If a video cable is connected to the video input jack, the built-in test patterns will not be displayed on the screen.

## SELF DIAGNOSTIC FUNCTION

Enter the service mode. Press the 9 button on the remote to check for proper execution of IC interfacing. The following is an explanation of what is displayed on screen:

| Display | Explanation |
|---|---|
| [SELF CHECK] | Self diagnostic function. |
| No. 23906201 | Part number of QA01. |
| POWER : 1 | Operation number of protecting circuit. 000 display is normal. |
| BUS LINE : OK | BUS line check. OK is normal. NG indicates a short to ground of the SCL or SDA signal or a short between SCL and SDA. |
| BUS CONT : OK | Bus line acknowledge check. OK is normal. A location number is NG. NG QA02 indicates QA02 is bad. |
| BLOCK : UV V1 V2 QV01 QV01S | Green display is normal. Cyan display is no check. Red display is NG. UV is TV mode, V1 is Video 1 mode. mode, V2 is Video 2 mode. |

## INITIALIZATION OF QA02

NOTE: QA02 must be initialized after replacement.

Enter the service mode. Press and hold the recall button on the remote while simultaneously pressing the channel up button on the receiver. The initialization of QA02 is complete. Program channels into memory.

## ITEM BUTTONS

The following is a list of the buttons on the remote that will go to an item or perform a different function of the service mode:

| | | | |
|---|---|---|---|
| 1 | RCUT | 5 | COLC |
| 2 | GCUT | 6 | TNTC |
| 3 | BCUT | 8 | Toggles Audio test signal on and off. |
| 4 | SCNT | 9 | Self Diagnostics |

## SUB COLOR (COLC) & SUB TINT (TNTC)

Tune in a color bar pattern. Set contrast to maximum and brightness to midrange. Connect an oscilloscope to the red cathode. Enter the service mode. Select item COLC and adjust reference value to obtain 150Vp-p. Tune in an active channel. Select item TNTC and adjust reference value for proper flesh tones.

## SUB BRIGHTNESS (BRTC)

Tune in a picture. Set contrast to minimum. Enter the service mode. Select item BRTC, adjust reference value until vertical retrace line just disappears. Adjust contrast for normal picture. Perform Height (HIT) adjustment.

## HORIZONTAL POSITION (HPOS) & VERTICAL POSITION (VPOS)

Enter the service mode. Press the TV/video button on remote until a crossbar pattern is displayed. Select item HPOS or VPOS and adjust reference value for the horizontal and vertical position alternately until the pattern is centered on the screen. Check the position of the picture with off-air signal.

## HEIGHT (HIT)

Enter the service mode. Press the TV/video button on remote until a crosshatch pattern is displayed. Select item HIT and adjust reference value for slight underscan. Advance the data value by 8 steps and check the vertical position of the picture.

## WIDTH (WID)

Enter the service mode. Press the TV/video button on remote until a crosshatch pattern is displayed. Select item WID, adjust reference value for slight underscan. Advance the reference value by 7 steps. Check for proper horizontal position of the picture.

## E-W PARABOLA (DPC)

Enter the service mode. Press the TV/video button on remote until a crosshatch pattern is displayed. Select item DPC, adjust reference value for straight vertical lines on both sides of the pattern.

## WHITE BALANCE (RCUT, GCUT, BCUT, GDRV, BDRV)

Turn receiver on. Allow a 10 to 30 minute warm up time. Adjust contrast to center and brightness to maximum. Enter the service mode. Press the TV/video button on remote until the white screen pattern is displayed. Select items RCUT, GCUT, BCUT, GDRV, and BDRV and set the reference value for each to 40H. Press the Video button on the remote to obtain a single horizontal line. Advance the screen control until a faint line of one predominant color appears on the screen. Adjust the other two cutoff items to obtain a dim white line. Press the Video button on the remote to get full deflection. Select items GDRV and BDRV and adjust reference value of each for the best black and white picture on screen.

## PURITY & CONVERGENCE

This model employs a bonded yoke. Purity and convergence are not recommended.

# MISCELLANEOUS ADJUSTMENTS continued

## STEREO ADJUSTMENTS

Enter the service mode.

### Attenuator (ATT)

Select item ATT. Input a 1kHz, 30% modulated signal. Connect a RMS meter to pin 12 of H002. Adjust reference value to obtain a reading of 130mVrms.

### Stereo VCO (STVC)

Select item STVC. Connect a frequency counter to pin 12 of H002 and connect pin 9 to ground. Adjust reference value to obtain a reading of 62.936kHz.

### SAP VCO (SAVC)

Select item SAVC. Input 78.67kHz, 147mVrms to pin 9 of H002. Input a mono signal. Adjust reference value for a reading in the center of the range for STA7=0 and STA8=1.

### Stereo Filter (STRF)

Select item STRF. Input 9.4kHz, 600mVrms to pin 9 of H002. Input a mono signal. Adjust reference value for a reading in the center of the range for STA3=1.

### SAP Filter (SAPF)

Select item SAPF. Input 88kHz, 110mVrms to pin 9 of H002. Input a mono signal. Adjust reference value for a reading in the center of the range for STA4=1.

### Stereo Separation (WBAN) & Spectral (SPEC)

Select item WBAN. Input 300Hz, right channel signal. Select stereo mode on receiver. Connect an oscilloscope to pin 14 of H002. Adjust reference value for minimum amplitude of waveform. Select item SPEC. Input 3kHz, right channel signal. Adjust reference value for minimum amplitude of waveform.

### Audio Test Signal

Enter the service mode. Press the 8 button on remote transmitter to toggle the audio test signal (1kHz) on and off.

# SCHEMATIC NOTES

| | |
|---|---|
| # | **For SAFETY use only equivalent replacement part, see parts list.** |
| ✳ | Circuitry not used in some versions. |
| --- | Circuitry used in some versions. |
| ⏚ | Ground |
| ⊥ | Chassis ground |
| ▽ | Common tie point |
| △ | Taken from common tie point |
| 3 | Schematic CIRCUITRACE ® Voltage source tie point. |
| A▬ | Cabling: Heavy lines reduce use of multiple lines. |

Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms taken with triggered scope and colorbar signal. Waveform voltage is peak to peak. Timebase is per division. Waveforms shown at 10 divisions.

Supply voltages maintained as seen at input.

Voltages measured with digital meter and a 1000μV RF signal, with colorbar pattern, applied to antenna terminal.

Controls adjusted for normal operation.

Capacitors are 50 volts or less, 5% or greater unless noted.

Electrolytic capacitors are 50 volts or less, 20% or greater unless noted.

Resistors are 1/2W or less, 5% or greater unless noted.

Value in ( ) used in some versions.

Measurements with switching as shown, unless noted.

Rated voltage shown on zener diodes.

## SERVICE AND DESIGN MODE ADJUSTMENT CHART

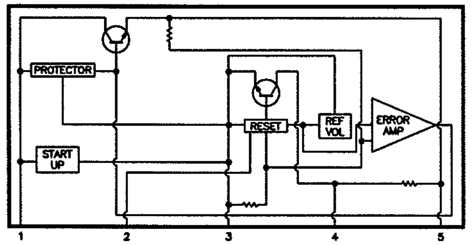
| Item | Adjustment Name | Direct Button | Reference Value | On-set Value |
|---|---|---|---|---|
| RCUT (1) | Red Cutoff | 1 | 40H | 80H |
| GCUT (1) | Green Cutoff | 2 | 40H | 48H |
| BCUT (1) | Blue Cutoff | 3 | 40H | 78H |
| GDRV (1) | Green Drive | - | 40H | 40H |
| BDRV (1) | Blue Drive | - | 40H | 44H |
| SCNT (1) | Sub Contrast | 4 | 08H | 06H |
| BRTC (1) | Sub Brightness | - | 40H | 44H |
| COLC (1) | Sub Color | 5 | 40H | 48H |
| TNTC (1) | Sub Tint | 6 | 40H | 48H |
| CNTC (2) | Contrast Center | - | - | 20H |
| CNTN (2) | Contrast Minimum | - | - | 06H |
| BRTX (2) | Brightness Maximum | - | - | 17H |
| BRTN (2) | Brightness Minimum | - | - | 17H |
| COLX (2) | Color Maximum | - | - | 60H |
| COLN (2) | Color Minimum | - | - | 04H |
| TNTX (2) | Tint Maximum | - | - | 1BH |
| TNTN (2) | Tint Minimum | - | - | 1BH |
| SHPT (2) | RF Sharpness Center | - | - | 24H |
| SHPV (2) | Video Sharpness Center | - | - | 20H |
| VMO (2) | VCD Bit Data | - | - | 63H |
| OVMO (2) | - | - | - | 43H |
| VM1 (2) | - | - | - | 01H |
| SAVC (1) | SAP VCO | - | 20H | 07H |
| ATT (1) | Attenuator | - | 20H | 07H |
| STVC (1) | Stereo VCO | - | 20H | 17H |
| SAPF (1) | - | - | - | 0AH |
| STRF (1) | Stereo Filter | - | 20H | 12H |
| SPEC (1) | Spectral | - | 20H | 23H |
| WBAN (1) | Stereo Separation | - | 20H | 1CH |
| HPOS (1) | Horizontal Position | - | 15H | 15H |
| VPOS (1) | Vertical Position | - | 02H | 02H |
| HIT (1) | Height | - | 32H | 1FH |
| LIN (1) | Vertical Linearity | - | 13H | 07H |
| VSC (1) | V-S Correction | - | 00H | 05H |
| VPS (1) | Vertical Shift | - | 1BH | 1BH |
| VCP (1) | Vertical Compensation | - | 03H | 03H |
| WID (1) | Picture Width | - | 16H | 1AH |
| DPC (1) | E-W Parabola | - | 31H | 0BH |
| CNR (1) | E-W Corner | - | 00H | 08H |
| TRAP (1) | Trapezium | - | 0FH | 0AH |
| HCP (1) | Horizontal Compensation | - | 00H | 00H |
| VFC (1) | V-F Correction | - | 0FH | 0FH |
| DAC (2) | - | - | - | 03H |
| WR9 (2) | - | - | - | 31H |
| WR16 (2) | - | - | - | 19H |
| H9L (2) | - | - | - | 17H |
| H9R (2) | - | - | - | 31H |
| H16L (2) | - | - | - | 0FH |
| H16R (2) | - | - | - | 3DH |
| V9U (2) | - | - | - | 02H |
| V9D (2) | - | - | - | FEH |
| V16U (2) | - | - | - | FAH |
| V16D (2) | - | - | - | 06H |
| YSH9 (2) | - | - | - | 53H |
| YSH6 (2) | - | - | - | BFH |
| YSV9 (2) | - | - | - | 97H |
| YSV6 (2) | - | - | - | 74H |
| YSC9 (2) | - | - | - | BDH |
| YSC6 (2) | - | - | - | 96H |
| PWR (2) | - | - | - | 00H |
| BUS (2) | - | - | - | 00H |
| MEM (2) | - | - | - | 00H |
| OPT0 (2) | - | - | - | 00H |
| OPT1 (2) | - | - | - | 80H |
| PHS (2) | - | - | - | ECH |
| BASC (2) | - | - | - | 06H |
| TREC (2) | - | - | - | 06H |
| WON1 (2) | - | - | - | 4CH |
| EBAS (2) | - | - | - | 00H |
| ETRE (2) | - | - | - | 02H |
| PRVL (2) | - | - | - | 09H |
| SBSC (2) | - | - | - | 50H |
| CNTX (2) | - | - | - | 3FH |
| OSCT (2) | - | - | - | 08H |
| OSBR (2) | - | - | - | 00H |
| OSCL (2) | - | - | - | F7H |
| OSTT (2) | - | - | - | FEH |
| SHPX (2) | - | - | - | 12H |
| SHPN (2) | - | - | - | 12H |
| OSPT (2) | - | - | - | 00H |
| OSPV (2) | - | - | - | 00H |
| RGBB (2) | - | - | - | 08H |
| ORGB (2) | - | - | - | 00H |
| OMRC (2) | - | - | - | 00H |
| OMGC (2) | - | - | - | 04H |
| OMBC (2) | - | - | - | 08H |
| OTRC (2) | - | - | - | 00H |
| OTGC (2) | - | - | - | 07H |
| OTBC (2) | - | - | - | 0EH |
| OMGD (2) | - | - | - | F7H |
| OMBD (2) | - | - | - | F0H |
| OTGD (2) | - | - | - | F0H |
| OTBD (2) | - | - | - | E3H |
| PHUE (2) | - | - | - | 40H |
| PCNT (2) | - | - | - | 1AH |
| PCOL (2) | - | - | - | 19H |
| PYOF (2) | - | - | - | 02H |
| PIOF (2) | - | - | - | 2FH |
| PQOF (2) | - | - | - | 2FH |
| PDA1 (2) | - | - | - | 80H |
| PDA2 (2) | - | - | - | 60H |
| PDA3 (2) | - | - | - | 64H |
| SYNN (2) | - | - | - | 1CH |
| SYNX (2) | - | - | - | 26H |
| SYCN (2) | - | - | - | 18H |
| SYCX (2) | - | - | - | 29H |
| SYCT (2) | - | - | - | 07H |
| OSD (2) | OSD Horizontal Position | - | - | 16H |

(1) May need adjustment when replacing QA01, QA02, or Q501.
(2) Only available in design mode. No adjustment is needed.

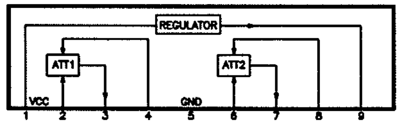
(1) May need adjustment when replacing QA01, QA02, or Q501.
(2) Only available in design mode. No adjustment is needed.

# IC FUNCTIONS

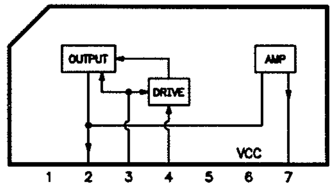
Q840
L78MR05



QG61
UPC1406HA



Q301
TA8427K



## Important Parts Information

- The parts listed here are those not usually available from a well-stocked supply cabinet or bin.
- Where items may be replaced with equivalent parts, several alternates are shown from participating vendors.
- On the parts lists, safety items are marked with a # to remind you that only exact replacements are recommended for these items.
- When ordering parts, state the model number, part number, and description.

## Obtaining Parts

Many of these parts are available from your local Sams authorized distributor or the manufacturer of the equipment. Call Sams for the name of your nearest distributor:

800-428-7267

Or consult the Sams *Annual Index* for the address of the original equipment manufacturer.

## Participating Vendors

Information on test equipment and replacement parts is listed in these pages for the following participating vendors. Consult the Sams *Annual Index* for their current address.

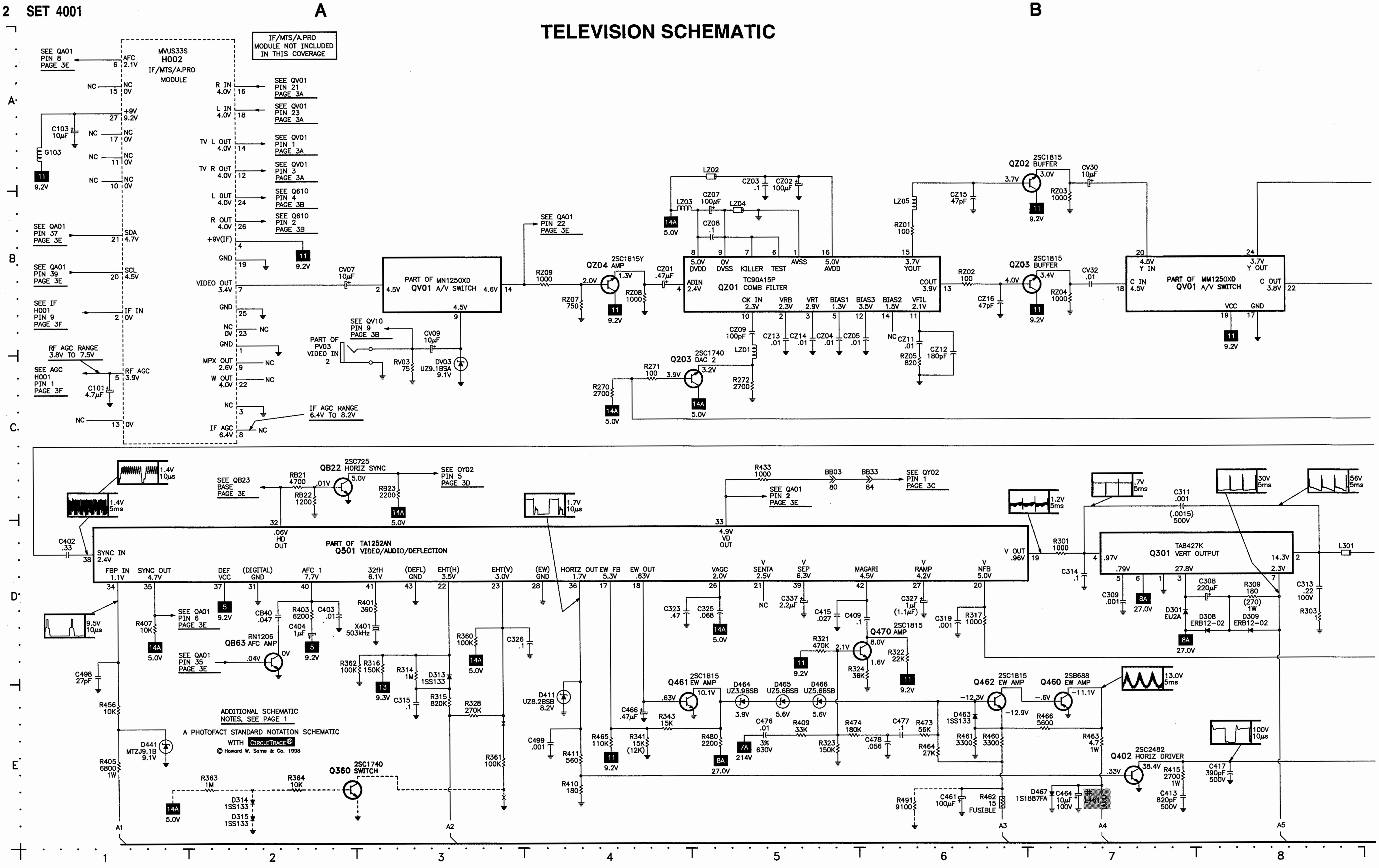
- Custom Components Corporation (Chek-A-Color)
- NTE Electronics, Inc. (NTE)
- Philips ECG Company (ECG)
- Terrell & Nobis (TNI Electronics)
- Sencore, Inc.
- Thomson Consumer Electronics, Inc. (SK, TCE)

## TEST EQUIPMENT

Test equipment listed by participating manufacturer illustrates typical or equivalent equipment used by Sams engineers to obtain measurements. This equipment is compatible with most types used by field service technicians.

| Equipment | Sencore No. | Equipment | Sencore No. |
|---|---|---|---|
| Oscilloscope | SC3100 | Isolation Transformer | PR570 |
| Generators | | Capacitance Analyzer | LC102 |
| RGB | CM2125 | CRT Analyzer | CR7000 |
| Multiburst Signal | VG91 | AC Leakage Tester | PR570 |
| Color Bar | VG91 | Inductance Analyzer | LC102 |
| TV Stereo | VG91 | Flyback Yoke Tester | TVA92 |
| Digital VOM | SC3100 | Field Strength Meter | SL753 |
| Frequency Meter | SC3100 | Transistor Tester | TF46 |
| Hi-Voltage Probe | HP200 | Horizontal Analyzer | HA-2500 |
| Accessory Probes | TP212 | Video Analyzer | VG91, TVA92 |

# TELEVISION SCHEMATIC



ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CircuiTrace®

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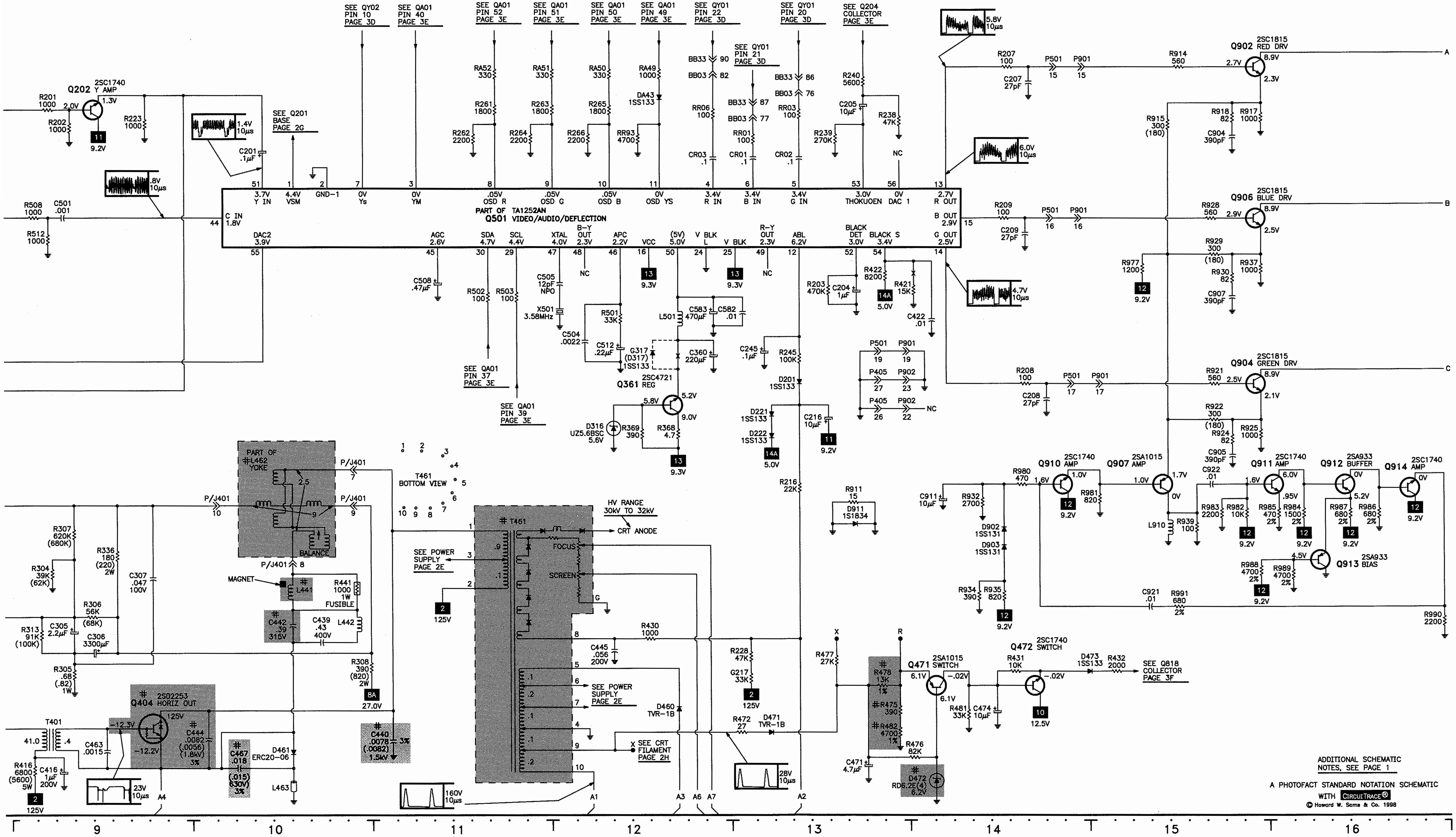
# TELEVISION SCHEMATIC continued



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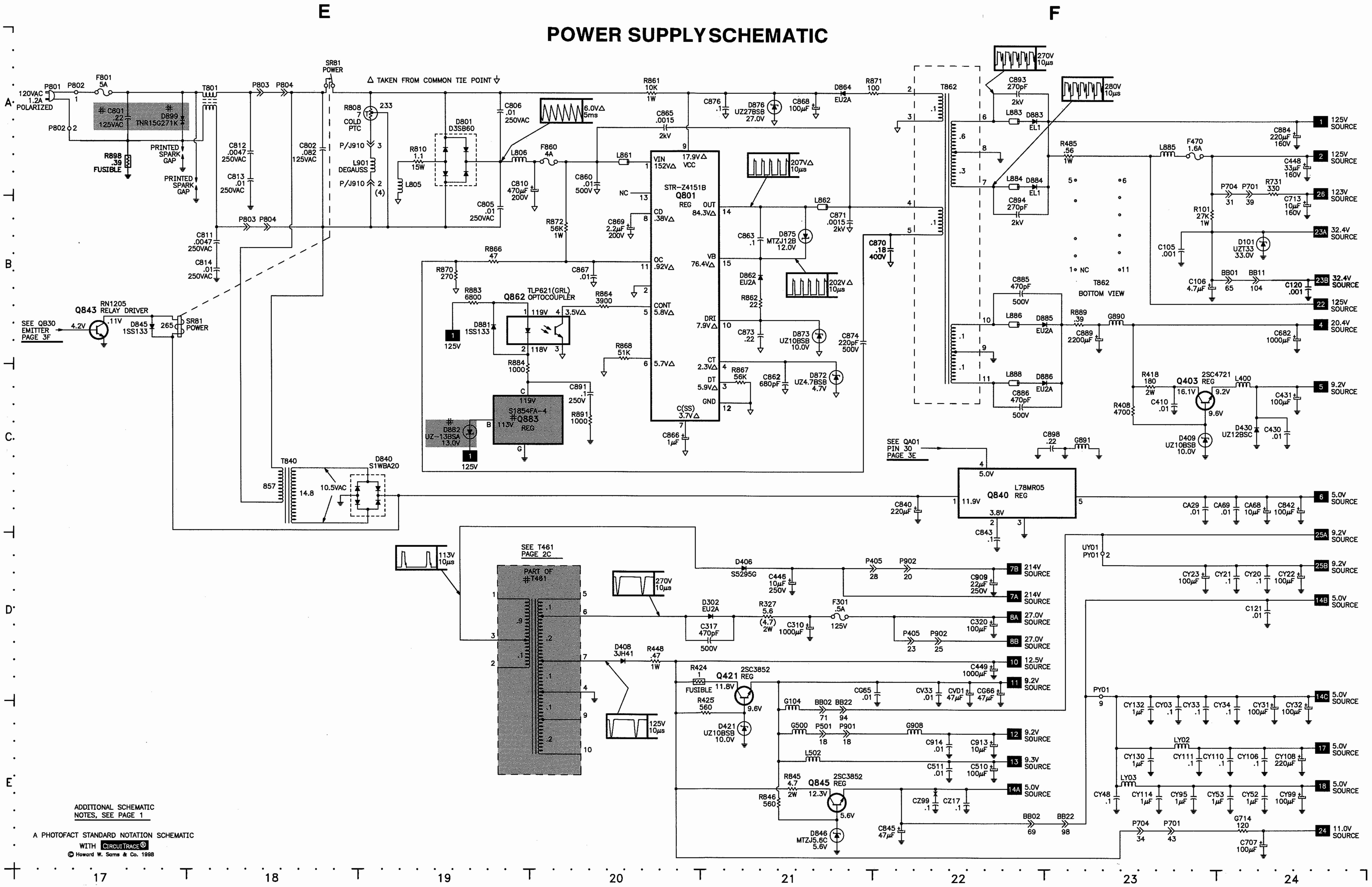
# POWER SUPPLY SCHEMATIC



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# G
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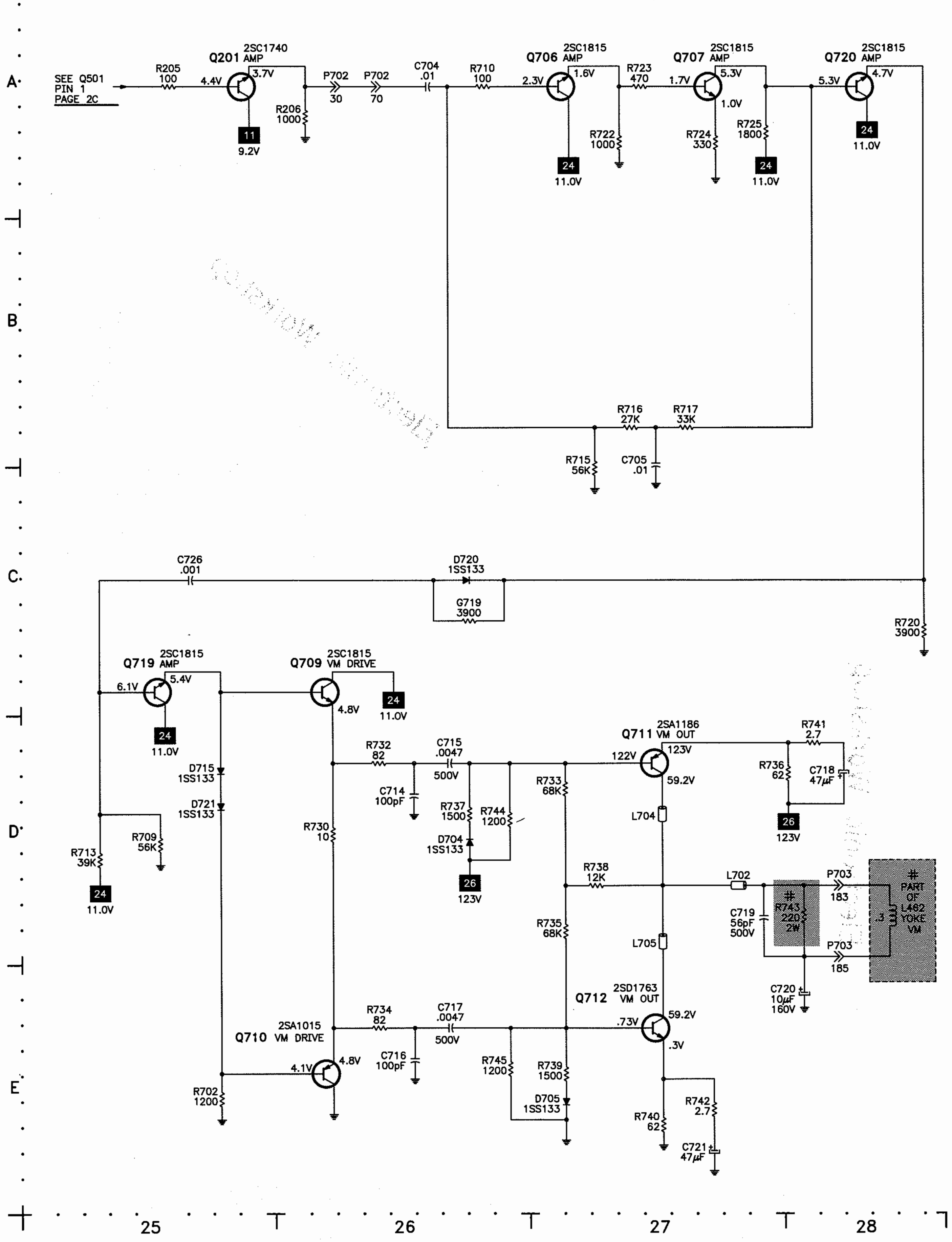

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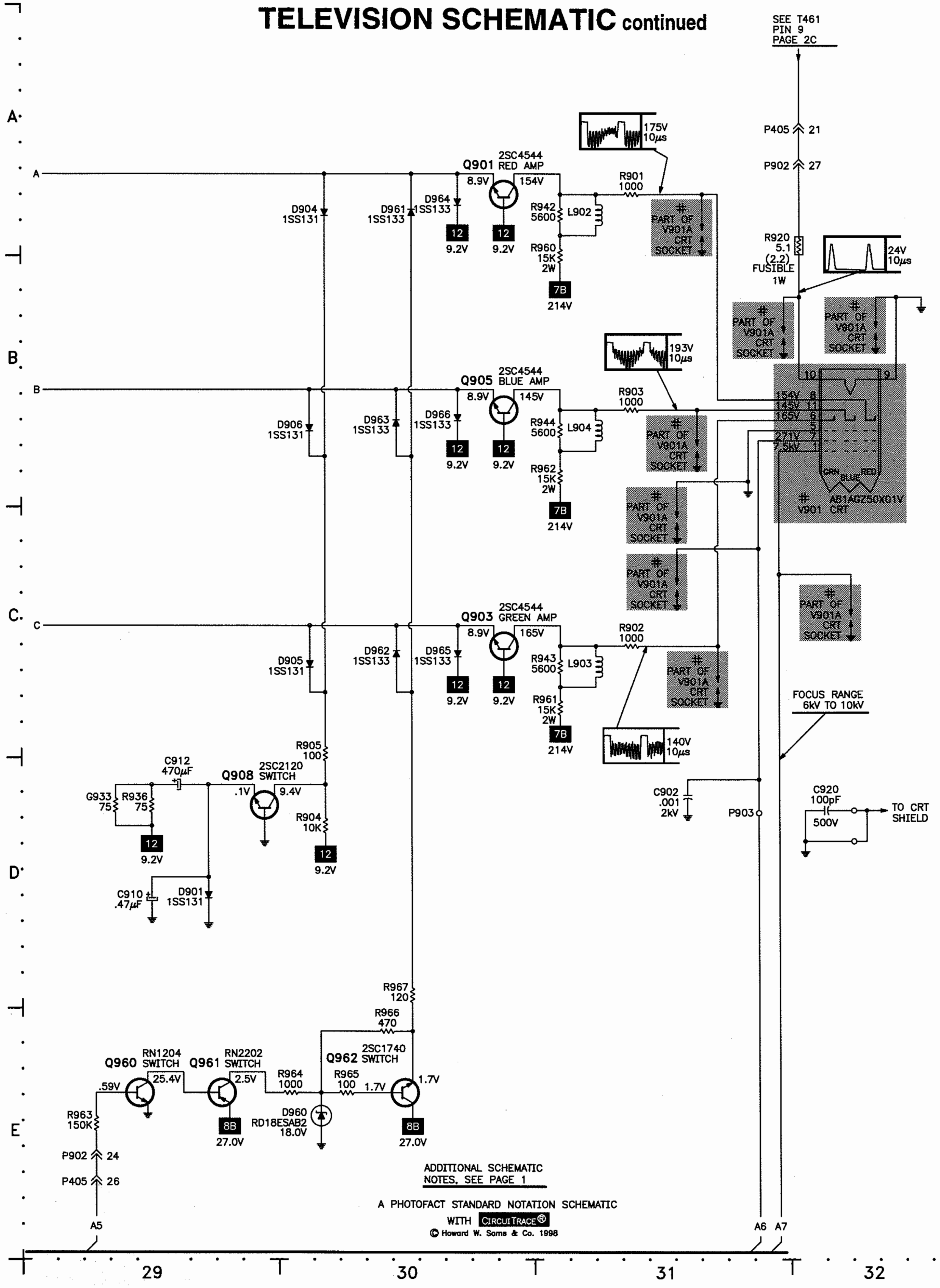

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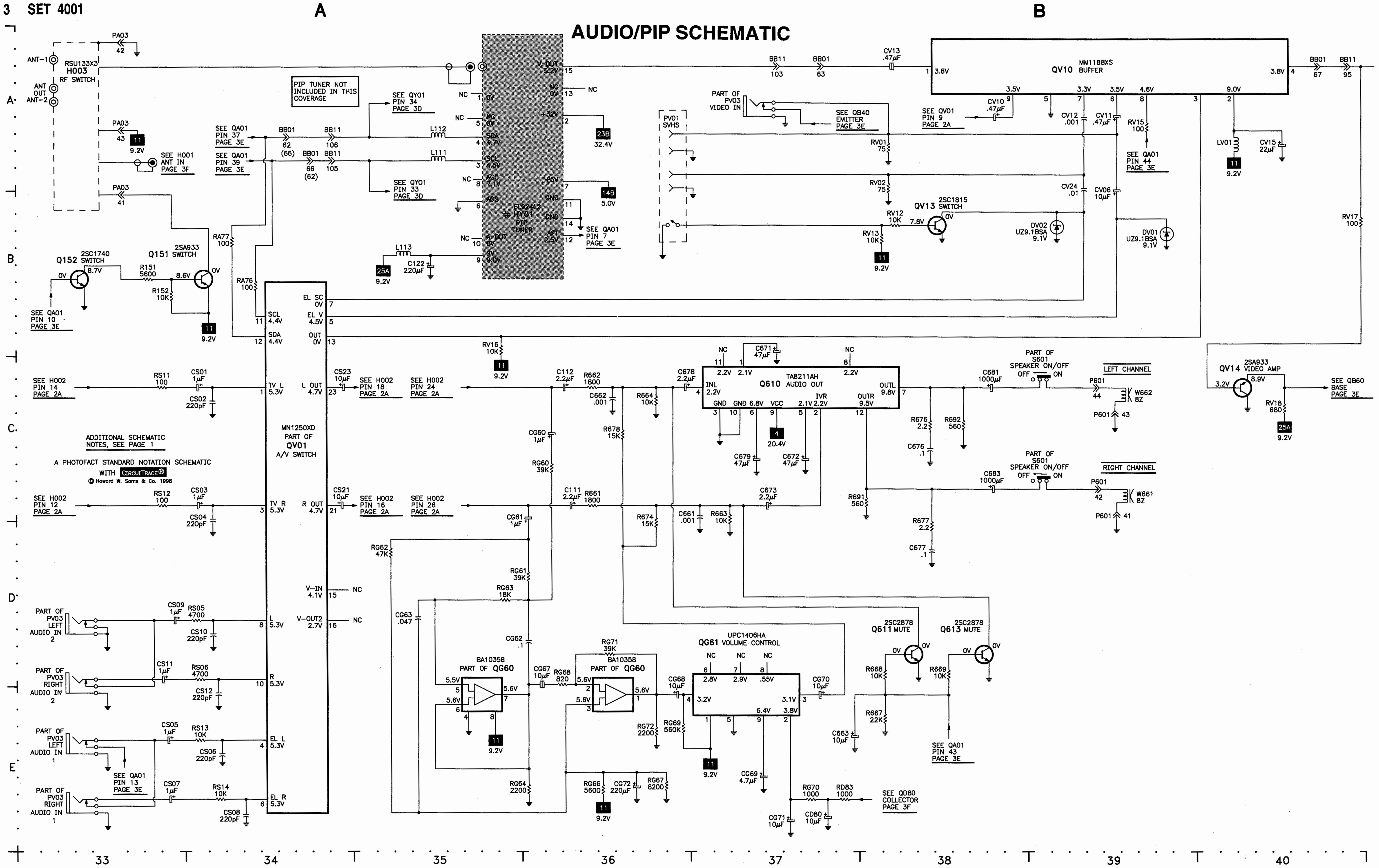
TOSHIBA

MODEL CN32G90 (CHASSIS TAC9723)

# AUDIO/PIP SCHEMATIC



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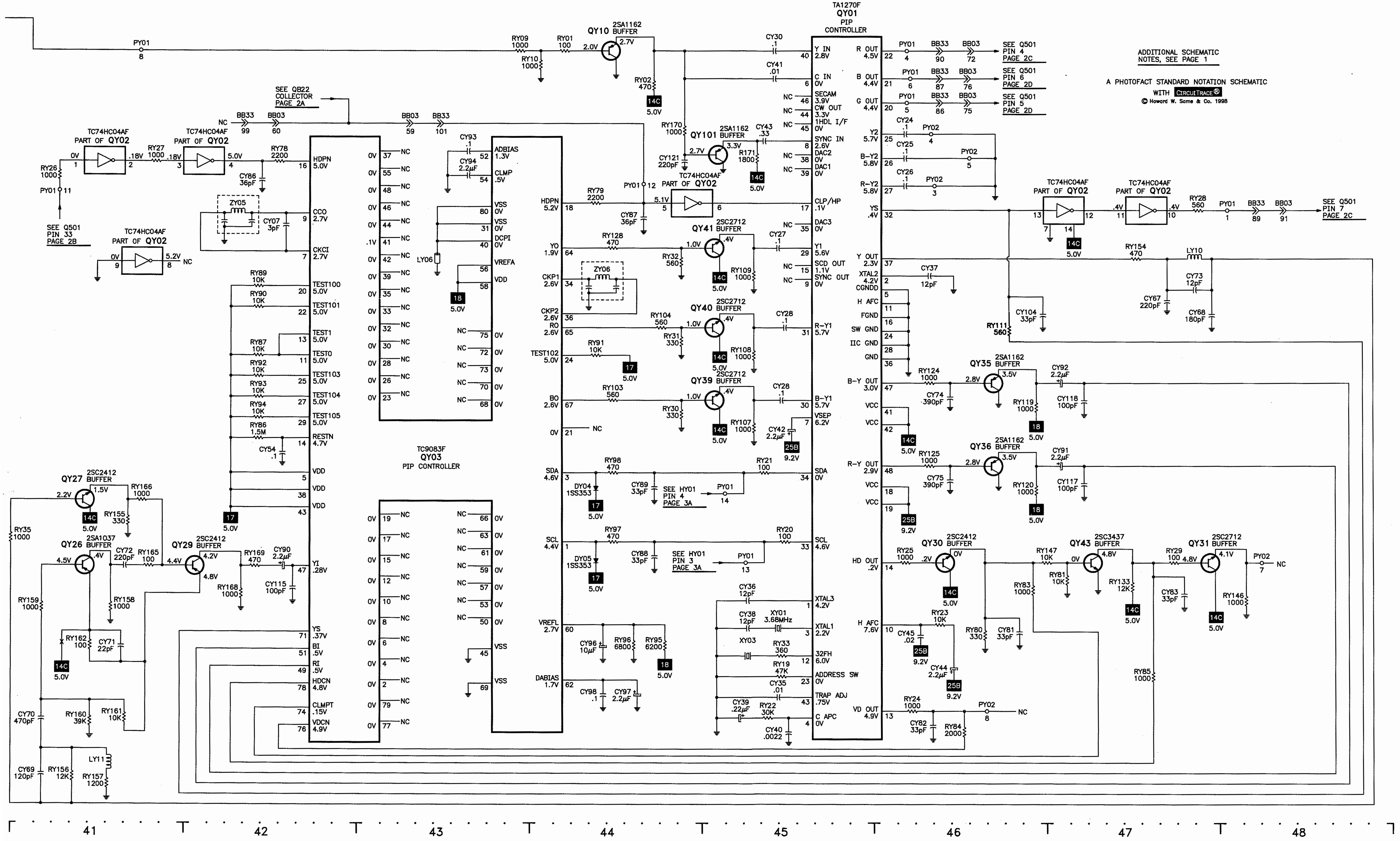

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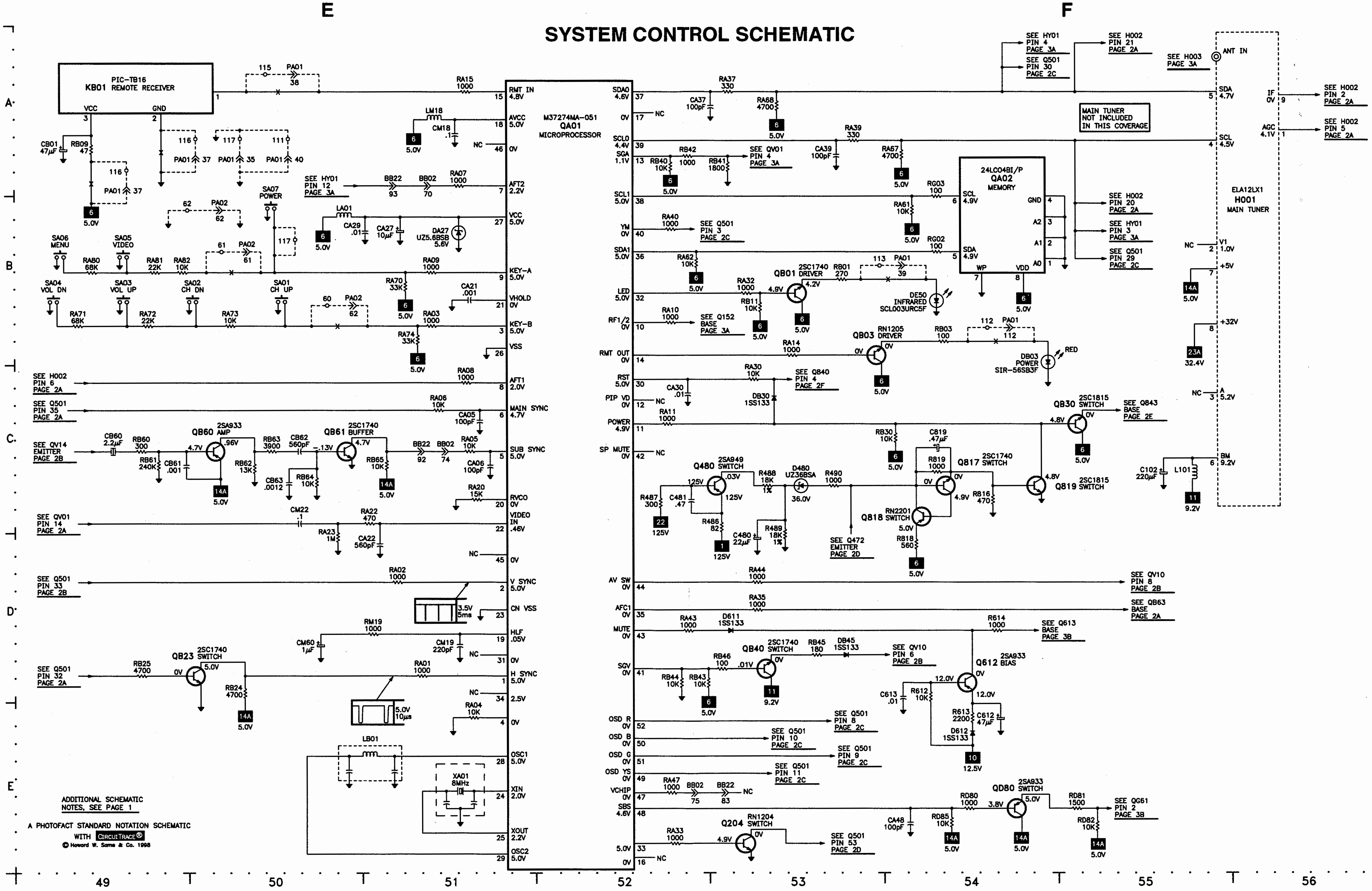
# SYSTEM CONTROL SCHEMATIC



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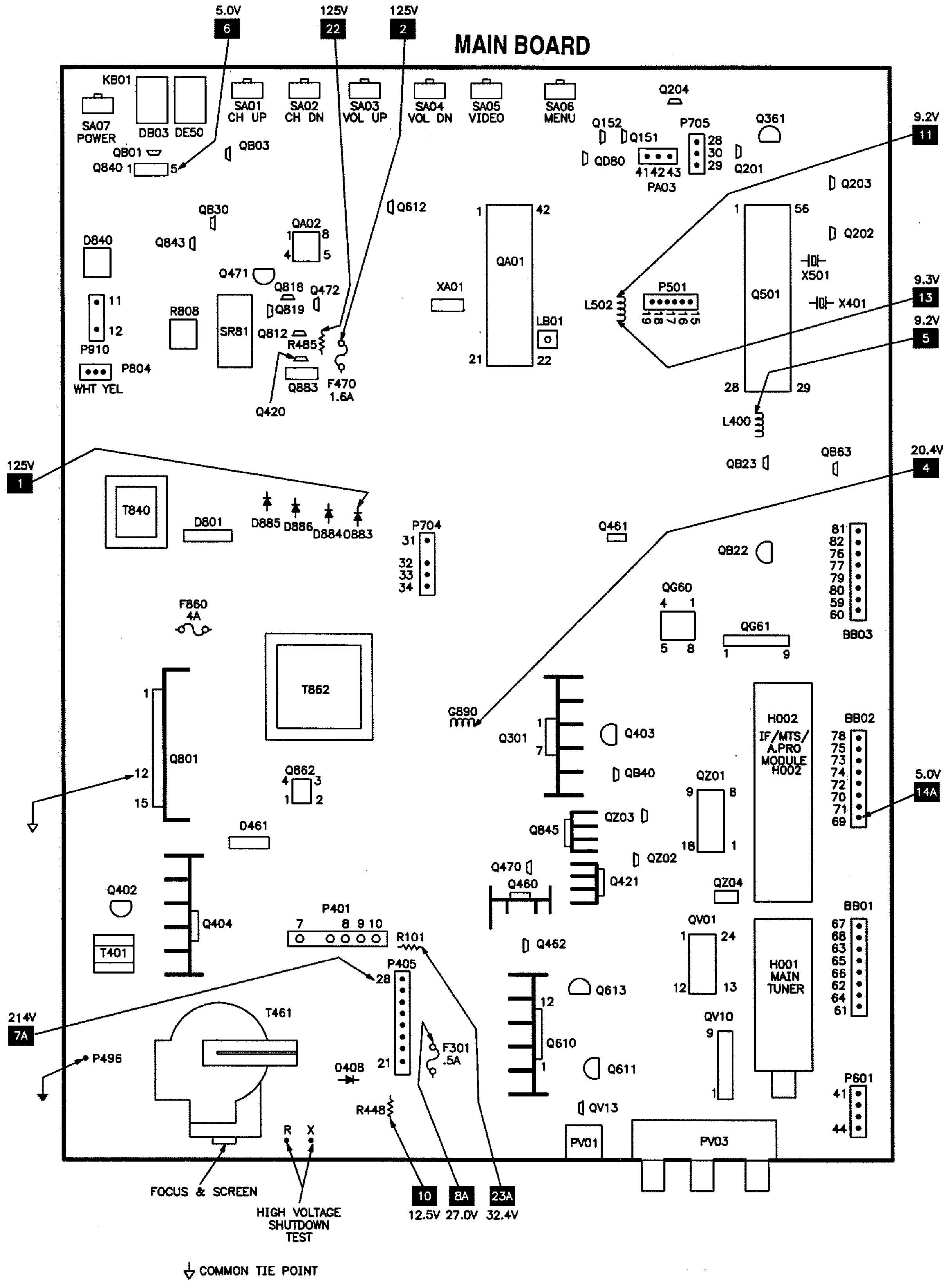
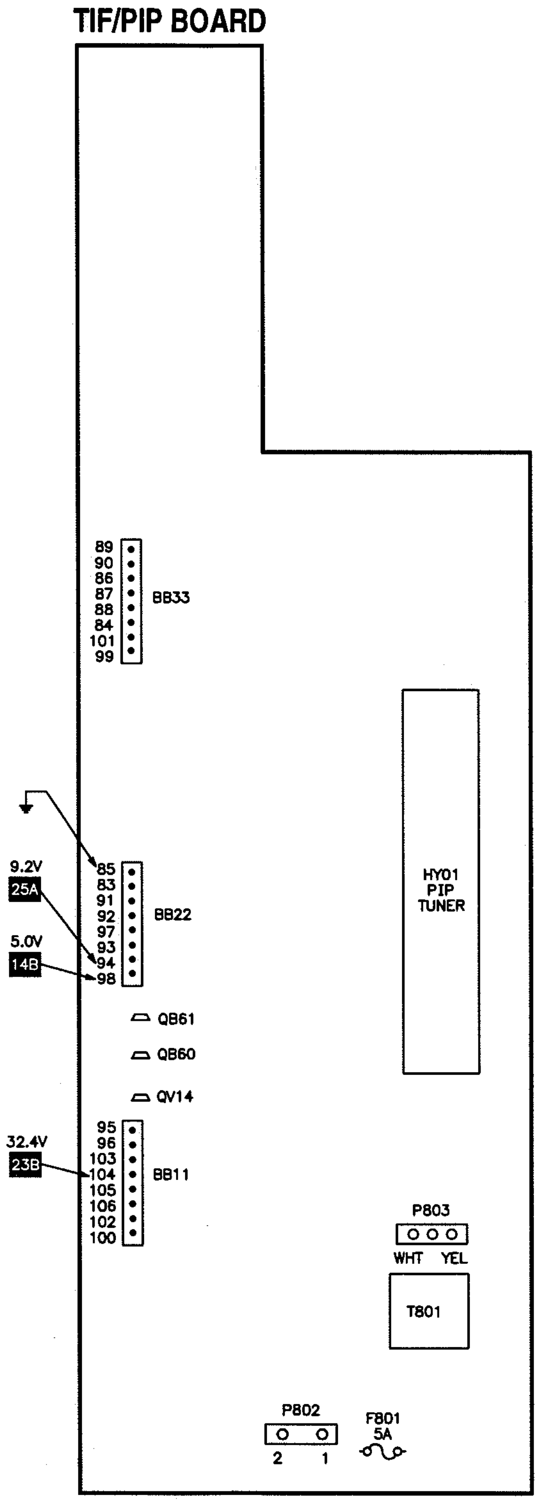
## SCHEMATIC COMPONENT LOCATION GUIDE

| | |
|---|---|
| C101 | C-1 |
| C102 | C-55 |
| C103 | A-1 |
| C105 | B-23 |
| C106 | B-23 |
| C111 | C-36 |
| C112 | C-36 |
| C120 | B-24 |
| C121 | D-24 |
| C122 | B-35 |
| C201 | B-10 |
| C204 | C-13 |
| C205 | B-13 |
| C207 | A-14 |
| C208 | C-14 |
| C209 | B-14 |
| C216 | C-13 |
| C245 | C-13 |
| C305 | D-9 |
| C306 | E-9 |
| C307 | D-9 |
| C308 | D-7 |
| C309 | D-7 |
| C310 | D-21 |
| C311 | D-7 |
| C313 | D-8 |
| C314 | D-7 |
| C315 | E-3 |
| C317 | D-20 |
| C319 | D-6 |
| C320 | D-22 |
| C323 | D-4 |
| C325 | D-5 |
| C326 | D-3 |
| C327 | D-6 |
| C337 | D-5 |
| C360 | C-12 |
| C402 | D-1 |
| C403 | D-2 |
| C404 | D-2 |
| C409 | D-5 |
| C410 | C-23 |
| C413 | E-7 |
| C415 | D-5 |
| C416 | E-9 |
| C417 | E-8 |
| C422 | C-14 |
| C430 | C-24 |
| C431 | C-24 |
| C439 | E-10 |
| C440 | E-11 |
| C442 | D-10 |
| C444 | E-10 |
| C445 | E-12 |
| C446 | D-21 |
| C448 | A-24 |
| C449 | D-22 |
| C461 | E-6 |
| C463 | E-9 |
| C464 | E-7 |
| C466 | E-4 |
| C467 | E-10 |
| C471 | E-13 |
| C474 | E-14 |
| C476 | E-5 |
| C477 | E-6 |
| C478 | E-6 |
| C480 | D-53 |
| C481 | C-52 |
| C498 | D-1 |
| C499 | E-4 |
| C501 | B-9 |
| C504 | C-12 |
| C505 | C-12 |
| C508 | C-11 |
| C510 | E-22 |
| C511 | E-22 |
| C512 | C-12 |
| C582 | C-13 |
| C583 | C-12 |
| C612 | E-54 |
| C613 | D-54 |
| C661 | D-37 |
| C662 | C-36 |
| C663 | E-37 |
| C671 | C-37 |
| C672 | C-37 |
| C673 | C-37 |
| C676 | C-38 |
| C677 | D-38 |
| C678 | C-36 |
| C679 | C-37 |
| C681 | C-38 |
| C682 | B-24 |
| C683 | C-38 |
| C704 | A-26 |
| C705 | C-27 |
| C707 | E-24 |
| C713 | B-24 |
| C714 | D-26 |
| C715 | D-26 |
| C716 | E-26 |
| C717 | E-26 |
| C718 | D-28 |
| C719 | D-27 |
| C720 | E-28 |
| C721 | E-27 |
| C726 | C-25 |
| C801 | A-17 |
| C802 | A-18 |
| C805 | B-19 |
| C806 | A-19 |
| C810 | B-19 |
| C811 | B-18 |
| C812 | A-18 |
| C813 | B-18 |
| C814 | B-18 |
| C819 | C-54 |
| C840 | C-22 |
| C842 | C-24 |
| C843 | D-22 |
| C845 | E-22 |
| C860 | B-20 |
| C862 | C-21 |
| C863 | B-21 |
| C865 | A-20 |
| C866 | C-20 |
| C867 | B-20 |
| C868 | A-21 |
| C869 | B-20 |
| C870 | B-22 |
| C871 | B-21 |
| C873 | B-21 |
| C874 | B-21 |
| C876 | A-21 |
| C884 | A-24 |
| C885 | B-22 |
| C886 | C-22 |
| C889 | B-23 |
| C891 | C-20 |
| C893 | A-22 |
| C894 | B-22 |
| C898 | C-22 |
| C902 | D-31 |
| C904 | B-15 |
| C905 | C-15 |
| C907 | C-15 |
| C909 | D-22 |
| C910 | D-29 |
| C911 | D-14 |
| C912 | D-29 |
| C913 | E-22 |
| C914 | E-22 |
| C920 | D-32 |
| C921 | D-15 |
| C922 | D-15 |
| CA05 | C-51 |
| CA06 | C-51 |
| CA21 | B-51 |
| CA22 | D-51 |
| CA27 | B-51 |
| CA29 | B-50 |
| CA29 | C-23 |
| CA30 | C-52 |
| CA37 | A-52 |
| CA39 | A-53 |
| CA48 | E-54 |
| CA68 | C-24 |
| CA69 | C-24 |
| CB01 | A-49 |
| CB40 | D-2 |
| CB60 | C-49 |
| CB61 | C-49 |
| CB62 | C-50 |
| CB63 | C-50 |
| CD80 | E-37 |
| CG60 | C-36 |
| CG61 | D-35 |
| CG62 | D-35 |
| CG63 | D-35 |
| CG65 | D-21 |
| CG66 | D-22 |
| CG67 | E-36 |
| CG68 | E-36 |
| CG69 | E-37 |
| CG70 | E-37 |
| CG71 | E-37 |
| CG72 | E-36 |
| CM18 | A-51 |
| CM19 | D-51 |
| CM22 | D-50 |
| CM60 | D-50 |
| CR01 | B-13 |
| CR02 | B-13 |
| CR03 | B-12 |
| CS01 | C-34 |
| CS02 | C-34 |
| CS03 | C-34 |
| CS04 | D-34 |
| CS05 | E-33 |
| CS06 | E-34 |
| CS07 | E-33 |
| CS08 | E-34 |
| CS09 | D-33 |
| CS10 | D-34 |
| CS11 | E-33 |
| CS12 | E-34 |
| CS21 | C-34 |
| CS23 | C-34 |
| CV01 | D-22 |
| CV06 | B-39 |
| CV07 | B-2 |
| CV09 | C-3 |
| CV10 | A-38 |
| CV11 | A-39 |
| CV12 | A-39 |
| CV13 | A-38 |
| CV15 | A-40 |
| CV24 | B-39 |
| CV30 | B-7 |
| CV32 | B-7 |
| CV33 | D-22 |
| CY03 | E-23 |
| CY07 | B-42 |
| CY104 | C-46 |
| CY106 | E-24 |
| CY108 | E-24 |
| CY110 | E-24 |
| CY111 | E-23 |
| CY114 | E-23 |
| CY115 | D-42 |
| CY117 | D-47 |
| CY118 | C-47 |
| CY121 | B-44 |
| CY130 | E-23 |
| CY132 | E-23 |
| CY20 | D-24 |
| CY21 | D-24 |
| CY22 | D-24 |
| CY23 | D-23 |
| CY24 | B-46 |
| CY25 | B-46 |
| CY26 | B-46 |
| CY27 | B-45 |
| CY28 | C-45 |
| CY28 | C-45 |
| CY30 | A-45 |
| CY31 | E-24 |
| CY32 | E-24 |
| CY33 | E-23 |
| CY34 | E-24 |
| CY35 | E-45 |
| CY36 | D-45 |
| CY37 | B-46 |
| CY38 | D-45 |
| CY39 | E-45 |
| CY40 | E-45 |
| CY41 | A-45 |
| CY42 | C-45 |
| CY43 | B-45 |
| CY44 | E-46 |
| CY45 | D-46 |
| CY48 | E-23 |
| CY52 | E-24 |
| CY53 | E-24 |
| CY54 | C-42 |
| CY67 | B-47 |
| CY68 | C-47 |
| CY69 | E-41 |
| CY70 | E-41 |
| CY71 | D-41 |
| CY72 | D-41 |
| CY73 | B-47 |
| CY74 | C-46 |
| CY75 | D-46 |
| CY81 | D-46 |
| CY82 | E-46 |
| CY83 | D-47 |
| CY86 | B-42 |
| CY87 | B-44 |
| CY88 | D-44 |
| CY89 | D-44 |
| CY90 | D-42 |
| CY91 | C-47 |
| CY92 | C-47 |
| CY93 | B-43 |
| CY94 | B-43 |
| CY95 | E-23 |
| CY96 | D-44 |
| CY97 | E-44 |
| CY98 | E-44 |
| CY99 | E-24 |
| CZ01 | B-4 |
| CZ02 | B-5 |
| CZ03 | B-5 |
| CZ04 | B-5 |
| CZ05 | B-5 |
| CZ07 | B-5 |
| CZ08 | B-5 |
| CZ09 | B-5 |
| CZ11 | C-6 |
| CZ12 | C-6 |
| CZ13 | B-5 |
| CZ14 | B-5 |
| CZ15 | B-6 |
| CZ16 | B-6 |
| CZ17 | E-22 |
| CZ99 | E-22 |
| D101 | B-24 |
| D201 | C-13 |
| D221 | C-13 |
| D222 | C-13 |
| D301 | D-7 |
| D302 | D-21 |
| D308 | D-7 |
| D309 | D-8 |
| D313 | E-3 |
| D314 | E-2 |
| D315 | E-2 |
| D316 | C-12 |
| D406 | D-21 |
| D408 | D-20 |
| D409 | C-23 |
| D411 | E-4 |
| D421 | E-21 |
| D430 | C-24 |
| D441 | E-1 |
| D460 | E-12 |
| D461 | E-10 |
| D463 | E-6 |
| D464 | E-5 |
| D465 | E-5 |
| D466 | E-5 |
| D467 | E-7 |
| D471 | E-13 |
| D472 | E-14 |
| D473 | E-14 |
| D480 | C-53 |
| D611 | D-53 |
| D612 | E-54 |
| D704 | D-26 |
| D705 | E-27 |
| D715 | D-25 |
| D720 | C-26 |
| D721 | D-25 |
| D801 | A-19 |
| D840 | C-19 |
| D845 | B-17 |
| D846 | E-21 |
| D862 | B-21 |
| D864 | A-21 |
| D872 | C-21 |
| D873 | B-21 |
| D875 | B-21 |
| D876 | A-21 |
| D881 | B-19 |
| D882 | C-19 |
| D883 | A-22 |
| D884 | B-22 |
| D885 | B-22 |
| D886 | C-22 |
| D899 | A-17 |
| D901 | D-29 |
| D902 | D-14 |
| D903 | D-14 |
| D904 | A-30 |
| D905 | C-30 |
| D906 | B-30 |
| D911 | D-13 |
| D960 | E-30 |
| D961 | A-30 |
| D962 | C-30 |
| D963 | B-30 |
| D964 | A-30 |
| D965 | C-30 |
| D966 | B-30 |
| DA27 | B-51 |
| DA43 | B-12 |
| DB03 | C-54 |
| DB30 | C-53 |
| DB45 | D-53 |
| DE50 | B-54 |
| DV01 | B-39 |
| DV02 | B-39 |
| DV03 | C-3 |
| DY04 | D-44 |
| DY05 | D-44 |
| F301 | D-21 |
| F470 | A-23 |
| F801 | A-17 |
| F860 | A-20 |
| G103 | A-1 |
| G104 | E-21 |
| G217 | E-13 |
| G317 | C-12 |
| G500 | E-21 |
| G714 | E-24 |
| G719 | C-26 |
| G890 | B-23 |
| G891 | C-23 |
| G908 | E-22 |
| G933 | D-29 |
| H001 | C-55 |
| H002 | A-1 |
| H003 | A-33 |
| HY01 | B-35 |
| KB01 | A-49 |
| L101 | C-55 |
| L111 | A-35 |
| L112 | A-35 |
| L113 | B-35 |
| L301 | D-8 |
| L400 | C-24 |
| L441 | D-10 |
| L442 | D-10 |
| L461 | E-7 |
| L462 | D-10 |
| L463 | E-10 |
| L501 | C-12 |
| L502 | E-21 |
| L702 | D-27 |
| L704 | D-27 |
| L705 | D-27 |
| L805 | B-19 |
| L806 | A-19 |
| L861 | A-20 |
| L862 | B-21 |
| L883 | A-22 |
| L884 | B-22 |
| L885 | A-23 |
| L886 | B-22 |
| L888 | C-22 |
| L901 | A-19 |
| L902 | A-31 |
| L903 | C-31 |
| L904 | B-31 |
| L910 | D-15 |
| LA01 | B-50 |
| LB01 | E-50 |
| LM18 | A-51 |
| LV01 | A-40 |
| LY02 | E-23 |
| LY03 | E-23 |
| LY06 | B-43 |
| LY10 | B-47 |
| LY11 | E-41 |
| LZ01 | C-5 |
| LZ02 | B-5 |
| LZ03 | B-4 |
| LZ04 | B-5 |
| LZ05 | B-6 |
| P801 | A-17 |
| PV03 | A-37 |
| PV03 | D-33 |
| PV03 | E-33 |
| PV03 | E-33 |
| PV03 | E-33 |
| Q151 | B-34 |
| Q152 | B-33 |
| Q201 | A-25 |
| Q202 | B-9 |
| Q203 | C-4 |
| Q204 | E-53 |
| Q301 | D-7 |
| Q361 | C-12 |
| Q402 | E-7 |
| Q403 | C-23 |
| Q404 | E-9 |
| Q421 | E-21 |
| Q460 | E-7 |
| Q461 | E-4 |
| Q462 | E-6 |
| Q470 | D-5 |
| Q471 | E-14 |
| Q472 | E-14 |
| Q480 | C-52 |
| Q501 | B-11 |
| Q501 | D-2 |
| Q610 | C-37 |
| Q611 | D-38 |
| Q612 | D-54 |
| Q613 | D-38 |
| Q706 | A-27 |
| Q707 | A-27 |
| Q709 | C-26 |
| Q710 | E-26 |
| Q711 | D-27 |
| Q712 | E-27 |
| Q719 | C-25 |
| Q720 | A-28 |
| Q801 | B-20 |
| Q817 | C-54 |
| Q818 | C-54 |
| Q819 | C-54 |
| Q840 | C-22 |
| Q843 | B-17 |
| Q845 | E-21 |
| Q862 | B-19 |
| Q883 | C-19 |
| Q901 | A-30 |
| Q902 | A-15 |
| Q903 | C-30 |
| Q904 | C-15 |
| Q905 | B-30 |
| Q906 | B-15 |
| Q907 | D-15 |
| Q908 | D-29 |
| Q910 | D-14 |
| Q911 | D-15 |
| Q912 | D-16 |
| Q913 | D-16 |
| Q914 | D-16 |
| Q960 | E-29 |
| Q961 | E-29 |
| Q962 | E-30 |
| Q360 | E-2 |
| QA01 | A-52 |
| QA02 | B-54 |
| QB01 | B-53 |
| QB03 | C-53 |
| QB22 | C-2 |
| QB23 | D-49 |
| QB30 | C-55 |
| QB40 | D-53 |
| QB60 | C-50 |
| QB61 | C-50 |
| QB63 | D-2 |
| QD80 | E-54 |
| QG60 | E-35 |
| QG60 | E-36 |
| QG61 | E-37 |
| QV01 | B-3 |
| QV01 | B-7 |
| QV01 | C-34 |
| QV10 | A-39 |
| QV13 | B-38 |
| QV14 | C-40 |
| QY01 | A-45 |
| QY02 | B-41 |
| QY02 | B-41 |
| QY02 | B-42 |
| QY02 | B-44 |
| QY02 | B-46 |
| QY02 | B-47 |
| QY03 | C-43 |
| QY10 | A-44 |
| QY101 | B-45 |
| QY26 | D-41 |
| QY27 | D-41 |
| QY29 | D-42 |
| QY30 | D-46 |
| QY31 | D-47 |
| QY35 | C-46 |
| QY36 | C-46 |
| QY39 | C-45 |
| QY40 | C-45 |
| QY41 | B-45 |
| QY43 | D-47 |
| QZ01 | B-5 |
| QZ02 | B-6 |
| QZ03 | B-6 |
| QZ04 | B-4 |
| R | E-13 |
| R101 | B-23 |
| R151 | B-33 |
| R152 | B-33 |
| R171 | B-45 |
| R201 | B-9 |
| R202 | B-9 |
| R203 | C-13 |
| R205 | A-25 |
| R206 | A-26 |
| R207 | A-14 |
| R208 | C-14 |
| R209 | B-14 |
| R216 | D-13 |
| R223 | B-9 |
| R228 | E-13 |
| R238 | B-13 |
| R239 | B-13 |
| R240 | A-13 |
| R245 | C-13 |
| R261 | B-11 |
| R262 | B-11 |
| R263 | B-12 |
| R264 | B-11 |
| R265 | B-12 |
| R266 | B-12 |
| R270 | C-4 |
| R271 | C-4 |
| R272 | C-5 |
| R301 | D-7 |
| R303 | D-8 |
| R304 | D-9 |
| R305 | E-9 |
| R306 | D-9 |
| R307 | D-9 |
| R308 | E-11 |
| R309 | D-8 |
| R313 | D-9 |
| R314 | D-3 |
| R315 | E-3 |
| R316 | D-3 |
| R317 | D-6 |
| R321 | D-5 |
| R322 | D-6 |
| R323 | E-5 |
| R324 | D-5 |
| R327 | D-21 |
| R328 | E-3 |
| R336 | D-9 |
| R341 | E-4 |
| R343 | E-4 |
| R360 | D-3 |
| R361 | E-3 |
| R362 | D-2 |
| R363 | E-2 |
| R364 | E-2 |
| R368 | C-12 |
| R369 | C-12 |
| R401 | D-3 |
| R403 | D-2 |
| R405 | E-1 |
| R407 | D-1 |
| R408 | C-23 |
| R409 | E-5 |
| R410 | E-4 |
| R411 | E-4 |
| R415 | E-7 |
| R416 | E-9 |
| R418 | C-23 |
| R421 | C-13 |
| R422 | B-13 |
| R424 | D-20 |
| R425 | E-20 |
| R430 | E-12 |
| R431 | E-14 |
| R432 | E-15 |
| R433 | C-5 |
| R441 | D-10 |
| R448 | D-20 |
| R456 | E-1 |
| R460 | E-6 |
| R461 | E-6 |
| R462 | E-6 |
| R463 | E-7 |
| R464 | E-6 |
| R465 | E-4 |
| R466 | E-7 |
| R472 | E-12 |
| R473 | E-6 |
| R474 | E-5 |
| R475 | E-13 |
| R476 | E-13 |
| R477 | E-13 |
| R478 | E-13 |
| R480 | E-5 |
| R481 | E-14 |
| R482 | E-13 |
| R485 | A-23 |
| R486 | D-53 |
| R487 | C-52 |
| R488 | C-53 |
| R489 | D-53 |
| R490 | C-53 |
| R491 | E-6 |
| R501 | C-12 |
| R502 | C-11 |
| R503 | C-11 |
| R508 | B-9 |
| R512 | B-9 |
| R612 | D-54 |
| R613 | E-54 |
| R614 | D-54 |
| R661 | C-36 |
| R662 | C-36 |
| R663 | D-37 |
| R664 | C-36 |
| R667 | E-38 |
| R668 | D-38 |
| R669 | D-38 |
| R674 | D-36 |
| R676 | C-38 |
| R677 | D-38 |
| R678 | C-36 |
| R691 | C-37 |
| R692 | C-38 |
| R702 | E-25 |
| R709 | D-25 |
| R710 | A-26 |
| R713 | D-25 |
| R715 | C-27 |
| R716 | B-27 |
| R717 | B-27 |
| R720 | C-28 |
| R722 | A-27 |
| R723 | A-27 |
| R724 | A-27 |
| R725 | A-27 |
| R730 | D-26 |
| R731 | B-24 |
| R732 | D-26 |
| R733 | D-27 |
| R734 | E-26 |
| R735 | D-27 |
| R736 | D-27 |
| R737 | D-26 |
| R738 | D-27 |
| R739 | E-27 |
| R740 | E-27 |
| R741 | D-28 |
| R742 | E-27 |
| R743 | D-28 |
| R744 | D-26 |
| R745 | E-26 |
| R808 | A-19 |
| R810 | A-19 |
| R816 | C-54 |
| R818 | D-54 |
| R819 | C-54 |
| R845 | E-21 |
| R846 | E-21 |
| R861 | A-20 |
| R862 | B-21 |
| R864 | B-20 |
| R866 | B-19 |
| R867 | C-21 |
| R868 | C-20 |
| R870 | B-19 |
| R871 | A-21 |
| R872 | B-20 |
| R883 | B-19 |
| R884 | C-19 |
| R889 | B-23 |
| R891 | C-20 |
| R898 | A-17 |
| R901 | A-31 |
| R902 | C-31 |
| R903 | B-31 |
| R904 | D-30 |
| R905 | D-30 |
| R911 | D-13 |
| R914 | A-15 |
| R915 | B-15 |
| R917 | B-15 |
| R918 | B-15 |
| R920 | B-31 |
| R921 | C-15 |
| R922 | C-15 |
| R924 | C-15 |
| R925 | C-15 |
| R928 | B-15 |
| R929 | B-15 |
| R930 | C-15 |
| R932 | D-14 |
| R934 | D-14 |
| R935 | D-14 |
| R936 | D-29 |
| R937 | B-15 |
| R939 | D-15 |
| R942 | A-31 |
| R943 | C-31 |
| R944 | B-31 |
| R960 | B-31 |
| R961 | C-31 |
| R962 | B-31 |
| R963 | E-29 |
| R964 | E-29 |
| R965 | E-30 |
| R966 | E-30 |
| R967 | D-30 |
| R977 | B-15 |
| R980 | D-14 |
| R981 | D-15 |
| R982 | D-15 |
| R983 | D-15 |
| R984 | D-16 |
| R985 | D-16 |
| R986 | D-16 |
| R987 | D-16 |
| R988 | D-15 |
| R989 | D-16 |
| R990 | D-16 |
| R991 | D-15 |
| RA01 | D-51 |
| RA02 | D-51 |
| RA03 | B-51 |
| RA04 | E-51 |
| RA05 | C-51 |
| RA06 | C-51 |
| RA07 | B-51 |
| RA08 | C-51 |
| RA09 | B-51 |
| RA10 | B-52 |
| RA11 | C-52 |
| RA14 | C-53 |
| RA15 | A-51 |
| RA20 | C-51 |
| RA22 | D-50 |
| RA23 | D-50 |
| RA30 | C-53 |
| RA32 | B-53 |
| RA33 | E-52 |
| RA35 | D-53 |
| RA37 | A-53 |
| RA39 | A-53 |
| RA40 | B-52 |
| RA43 | D-52 |
| RA44 | D-53 |
| RA47 | E-52 |
| RA49 | A-12 |
| RA50 | A-12 |
| RA51 | A-12 |
| RA52 | A-11 |
| RA61 | B-54 |
| RA62 | B-52 |
| RA67 | A-54 |
| RA68 | A-53 |
| RA70 | B-51 |
| RA71 | B-49 |
| RA72 | B-49 |
| RA73 | B-50 |
| RA74 | B-51 |
| RA76 | B-34 |
| RA77 | B-34 |
| RA80 | B-49 |
| RA81 | B-49 |
| RA82 | B-49 |
| RB01 | B-53 |
| RB03 | B-54 |
| RB09 | A-49 |
| RB11 | B-53 |
| RB21 | C-2 |
| RB22 | C-2 |
| RB23 | C-3 |
| RB24 | D-50 |
| RB25 | D-49 |
| RB30 | C-54 |
| RB40 | A-52 |
| RB41 | A-53 |
| RB42 | A-52 |
| RB43 | D-52 |
| RB44 | D-52 |
| RB45 | D-53 |
| RB46 | D-52 |
| RB60 | C-49 |
| RB61 | C-49 |
| RB62 | C-50 |
| RB63 | C-50 |
| RB64 | C-50 |
| RB65 | C-51 |
| RD80 | E-54 |
| RD81 | E-55 |
| RD82 | E-55 |
| RD83 | E-37 |
| RD85 | E-54 |
| RG02 | B-54 |
| RG03 | B-54 |
| RG60 | C-36 |
| RG61 | D-35 |
| RG62 | D-35 |
| RG63 | D-35 |
| RG64 | E-35 |
| RG66 | E-36 |
| RG67 | E-36 |
| RG68 | E-36 |
| RG69 | E-36 |
| RG70 | E-37 |
| RG71 | D-36 |
| RG72 | E-36 |
| RM19 | D-50 |
| RR01 | B-13 |
| RR03 | B-13 |
| RR06 | B-12 |
| RR93 | B-12 |
| RS05 | D-34 |
| RS06 | E-34 |
| RS11 | C-33 |
| RS12 | C-33 |
| RS13 | E-34 |
| RS14 | E-34 |
| RV01 | A-38 |
| RV02 | B-38 |
| RV03 | C-3 |
| RV12 | B-38 |
| RV13 | B-38 |
| RV15 | A-39 |
| RV16 | C-35 |
| RV17 | B-40 |
| RV18 | C-40 |
| RY01 | A-44 |
| RY02 | A-44 |
| RY09 | A-43 |
| RY10 | A-44 |
| RY103 | C-44 |
| RY104 | C-44 |
| RY107 | C-45 |
| RY108 | C-45 |
| RY109 | B-45 |
| RY111 | C-46 |
| RY119 | C-46 |
| RY120 | D-46 |
| RY124 | C-46 |
| RY125 | C-46 |
| RY128 | B-44 |
| RY133 | D-47 |
| RY146 | D-48 |
| RY147 | D-46 |
| RY154 | B-47 |
| RY155 | D-41 |
| RY156 | E-41 |
| RY157 | E-41 |
| RY158 | D-41 |
| RY159 | D-41 |
| RY160 | E-41 |
| RY161 | E-41 |
| RY162 | D-41 |
| RY165 | D-41 |
| RY166 | D-41 |
| RY168 | D-42 |
| RY169 | D-42 |
| RY170 | B-44 |
| RY19 | E-45 |
| RY20 | D-45 |
| RY21 | D-45 |
| RY22 | E-45 |
| RY23 | D-46 |
| RY24 | E-46 |
| RY25 | D-46 |
| RY26 | B-41 |
| RY27 | B-41 |
| RY28 | B-47 |
| RY29 | D-47 |
| RY30 | C-44 |
| RY31 | C-44 |
| RY32 | B-44 |
| RY33 | E-45 |
| RY35 | D-41 |
| RY78 | B-42 |
| RY79 | B-44 |
| RY80 | D-46 |
| RY81 | D-47 |
| RY83 | D-46 |
| RY84 | E-46 |
| RY85 | E-47 |
| RY86 | C-42 |
| RY87 | C-42 |
| RY89 | B-42 |
| RY90 | C-42 |
| RY91 | C-44 |
| RY92 | C-42 |
| RY93 | C-42 |
| RY94 | C-42 |
| RY95 | D-44 |
| RY96 | D-44 |
| RY97 | D-44 |
| RY98 | D-44 |
| RZ01 | B-6 |
| RZ02 | B-6 |
| RZ03 | B-7 |
| RZ04 | B-7 |
| RZ05 | C-6 |
| RZ07 | B-4 |
| RZ08 | B-4 |
| RZ09 | B-4 |
| S601 | C-39 |
| S601 | C-39 |
| SA01 | B-50 |
| SA02 | B-49 |
| SA03 | B-49 |
| SA04 | B-49 |
| SA05 | B-49 |
| SA06 | B-49 |
| SA07 | B-50 |
| SR81 | A-18 |
| SR81 | B-17 |
| T401 | E-9 |
| T461 | D-11 |
| T461 | D-20 |
| T801 | A-18 |
| T840 | C-18 |
| T862 | A-22 |
| V901 | C-32 |
| W661 | C-39 |
| W662 | C-39 |
| X | E-13 |
| X401 | D-3 |
| X501 | C-12 |
| XA01 | E-51 |
| XY01 | D-45 |
| XY03 | E-45 |
| ZY05 | B-42 |
| ZY06 | B-44 |

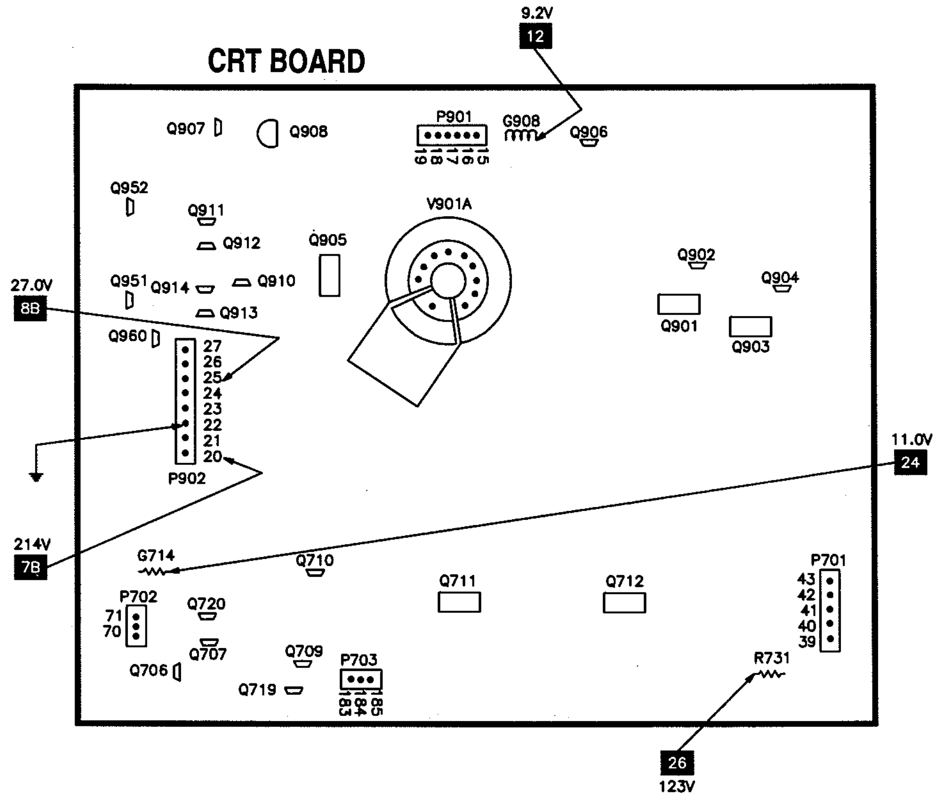
# PLACEMENT CHART



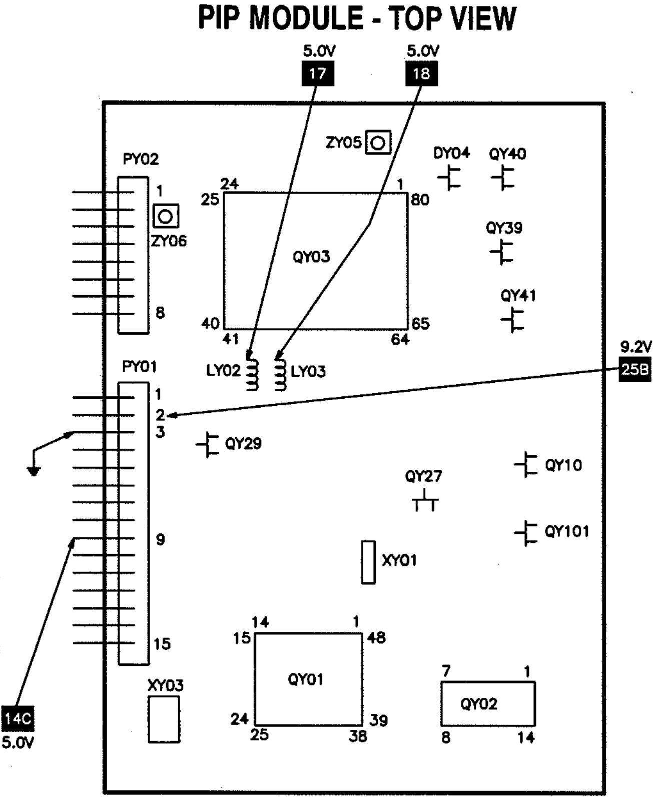
MAIN BOARD



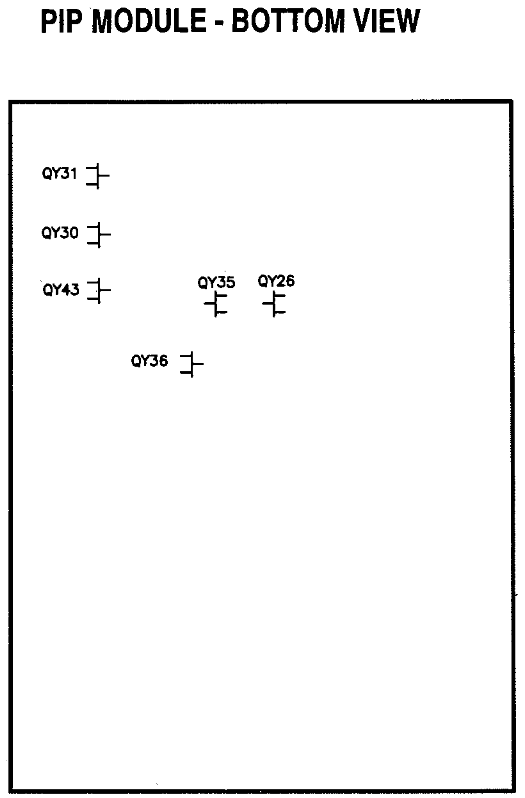
TIF/PIP BOARD



CRT BOARD



PIP MODULE - TOP VIEW



PIP MODULE - BOTTOM VIEW

# PARTS LIST

## SEMICONDUCTORS

(Select the replacement that gives the best results.)

| Item No. | Type No. | Mfr. Part No. | NTE Part No. | ECG Part No. | TCE Part No. |
|---|---|---|---|---|---|
| D101 | UZT33 | 23316694 | - | - | - |
| D201, 21, 22 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D301, 02 | EU2A | 23118094 | NTE552 | ECG552 | SK9000 |
| D308, 09 | ERB12-02 | 23118822 | NTE552 | ECG552 | SK9000 |
| D313 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D314, 15 (1) | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D316 | UZ5.6BSC | 23316310 | - | - | - |
| D316 (1) | UZ6.8BSC | 23316316 | - | - | - |
| D406 | S5295G | A7978850 | NTE552 | ECG552 | SK9000 |
| D408 | 3JH41 | A7580658 | - | - | - |
|  | RU4Z | - | NTE580 | ECG580 | SK5036 |
| D409 | UZ10BSB | 23316327 | - | - | - |
|  | MTZJ10B | - | - | - | - |
|  | RD10ESAB2 | - | - | - | - |
| D411 | UZ8.2BSB | 23316321 | - | - | - |
| D421 | UZ10BSB | 23316327 | - | - | - |
|  | MTZJ10B | - | - | - | - |
|  | RD10ESAB2 | - | - | - | - |
| D430 | UZ12BSC | 23316334 | - | - | - |
| D441 | MTZJ9.1B | 23316687 | - | - | - |
| D460 | TVR-1B | A7568460 | NTE552 | ECG552 | SK9000 |
| D461 | ERC20-06 | 23316582 | NTE598 | ECG598 | SK9859 |
| D463 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D464 | UZ3.9BSB | 23316332 | - | - | - |
| D465 | UZ5.6BSB | 23316309 | NTE5011A | ECG5011A | SK5A6 |
| D466 | UZ5.6BSB | 23316309 | NTE5011A | ECG5011A | SK5A6 |
| D467 | 1S1887FA | - | NTE116 | ECG116 | SK3313 |
|  | 1S1887 | A7568719 | NTE116 | ECG116 | SK3312 |
| D471 | TVR-1B | A7568460 | NTE552 | ECG552 | SK9000 |
| # **D472** | RD6.2E(4) | 23115774 | NTE5013A | ECG5013A | SK6A2 |
| D473 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D480 | UZ36BSA | 23316370 | - | - | - |
| D611, 12 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D704, 05, 15 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D720, 21 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D801 | D3SB60 | - | NTE5310 | ECG5310 | SK5030 |
|  | RBV-406M | - | NTE5330 | ECG5330 | SK9972 |
| D840 | S1WBA20 | 23316962 | - | - | - |
|  | S1WBA60 | - | NTE5332 | ECG5332 | SK9232 |
| D845 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D846 | UZ5.6BSC | 23316310 | - | - | - |
|  | MTZJ5.6C | - | - | - | - |
|  | RD5.6ESA | - | - | - | - |
| D862, 64 | EU2A | 23118094 | NTE552 | ECG552 | SK9000 |
| D872 | UZ4.7BSB | 23316302 | NTE5009A | ECG5009A | SK4A7 |
|  | MTZJ4.7B | - | - | - | - |
|  | RD4.7ESAB2 | - | NTE5009A | ECG5009A | SK4A7 |
| D873 | UZ10BSB | 23316327 | - | - | - |
|  | MTZJ10B | - | - | - | - |
|  | RD10ESAB2 | - | - | - | - |

**# For SAFETY use only equivalent replacement part.**
(1) Used in model CN36G95.

## SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

| Item No. | Type No. | Mfr. Part No. | NTE Part No. | ECG Part No. | TCE Part No. |
|---|---|---|---|---|---|
| D875 | MTZJ12B | - | - | - | - |
|  | UZ12BSB | 23316333 | - | - | - |
|  | RD12ESAB2 | - | - | - | - |
| D876 | UZ27BSB | 23316359 | - | - | - |
|  | MTZJ27B | - | - | - | - |
|  | RD27ESAB2 | - | - | - | - |
| D881 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| # **D882** | UZ-13BSA | 23316335 | - | - | - |
| D883, 84 | EL1 | 23357021 | - | - | - |
| D885, 86 | EU2A | 23118094 | NTE552 | ECG552 | SK9000 |
| # **D899** | TNR15G271K | - | - | - | - |
|  | ENC271D-14A | 24000268 | - | - | - |
| D901 Thru D906 | 1SS131 | 23115537 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| D911 | 1S1834 | A7568250 | NTE552 | ECG552 | SK9000 |
| D960 | RD18ESAB2 | 23118499 | - | - | - |
| D961 Thru D966 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| DA27 | UZ5.6BSB | 23316309 | NTE5011A | ECG5011A | SK5A6 |
|  | RD5.6ESAB2 | - | NTE5011A | ECG5011A | SK5A6 |
|  | MTZJ5.6B | - | NTE5011T1 | ECG5011T1 | SK9968 |
| DA43 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| DB03 | SIR-56SB3F | 23358522 | - | - | - |
| DB30, 45 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| DE50 | SCL003URC5F | 23358501 | - | - | - |
| DV01, 02, 03 | UZ9.1BSA | 23316323 | - | - | - |
|  | MTZJ9.1A | - | - | - | - |
|  | RD9.1ESAB1 | - | - | - | - |
| DY04, 05 | 1SS353 | - | - | - | - |
| G317 | 1SS133 | 23118859 | NTE519 | ECG519 | SK3100 |
|  | 1SS120-7 | - | - | - | - |
| Q151 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
|  | 2SA564A-Q | - | NTE290A | ECG290A | SK3932 |
|  | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q152 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q201, 02, 03 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q204 | RN1204 | A6002040 | NTE2359 | ECG2359 | SK9959 |
| Q301 | TA8427K | B0378560 | - | - | - |
| Q360 (1) | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q361 | 2SC4721P | 23314444 | - | - | - |
|  | 2SC2655-Y(C) | - | NTE293 | ECG293 | SK3849 |
| Q402 | 2SC2482FA-1 | A6330069 | NTE399 | ECG399 | SK9352 |
| Q402 (1) | 2SC1569FA-5 | 23114908 | NTE376 | ECG376 | SK3219 |
| Q403 | 2SC4721P | 23314444 | - | - | - |
|  | 2SC2655Y | - | NTE293 | ECG293 | SK3849 |
| # **Q404** | 2SD2253FA | A6872801 | - | - | - |
| Q421 | 2SC3852 | 23314141 | NTE56% | ECG56% | SK9364% |

**# For SAFETY use only equivalent replacement part.**
(1) Used in model CN36G95.
% Use insulating hardware supplied with replacement.

## SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

| Item No. | Type No. | Mfr. Part No. | NTE Part No. | ECG Part No. | TCE Part No. |
|---|---|---|---|---|---|
| Q460 | 2SB688-O(BS) | A6625365 | NTE37 | ECG37 | SK9415 |
|  | 2SA1788E | - | - | - | - |
| Q461, 62 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q470 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q471 | 2SA1015-0 | A6534036 | NTE290A | ECG290A | SK9132 |
|  | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q472 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q480 | 2SA949-Y(C) | A6532853 | NTE383 | ECG383 | SK9138 |
| Q501 | TA1252AN | 23906027 | - | - | - |
| Q610 | TA8211AH | B0376856 | - | - | - |
| Q611 | 2SC2878A | - | NTE85 | ECG85 | SK9465 |
|  | 2SC2878-A(TE) | A6342206 | - | - | - |
| Q612 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
|  | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
|  | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q613 | 2SC2878A | - | NTE85 | ECG85 | SK9465 |
|  | 2SC2878-A(TE) | A6342206 | - | - | - |
| Q706, 07, 09 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q710 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
|  | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
|  | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q711 | 2SA1186A | 23314701 | NTE37 | ECG37 | SK9415 |
|  | 2SA1186A,E | - | NTE37 | ECG37 | SK9415 |
| Q712 | 2SD1763A | 23314705 | NTE375 | ECG375 | SK9118 |
|  | 2SD1763,VE | - | NTE375 | ECG375 | SK9118 |
| Q719, 20 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q801 | STR-Z4151B | 23905968 | - | - | - |
| Q817 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| Q818 | RN2201 | A6012010 | - | - | - |
| Q819 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q840 | L78MR05 | 23318299 | - | - | - |
| Q843 | RN1205 | A6002050 | - | - | - |
| Q845 | 2SC3852 | 23314141 | NTE56% | ECG56% | SK9364% |
| Q862 | TLP621(GRL) | A8643135 | NTE3098 | ECG3098 | SK10178 |
| # **Q883** | S1854FA-4 | A6907777 | - | - | - |
| Q901 | 2SC4544 | A6368700 | NTE376% | ECG376% | SK9362A% |
| Q902 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q903 | 2SC4544 | A6368700 | NTE376% | ECG376% | SK9362A% |
| Q904 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q905 | 2SC4544 | A6368700 | NTE376% | ECG376% | SK9362A% |
| Q906 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
|  | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
|  | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |

**# For SAFETY use only equivalent replacement part.**
% Use insulating hardware supplied with replacement.

# PARTS LIST continued

## SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

| Item No. | Type No. | Mfr. Part No. | NTE Part No. | ECG Part No. | TCE Part No. |
|---|---|---|---|---|---|
| Q907 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
| | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
| | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q908 | 2SC2120-Y(TE) | A6321265 | NTE289A | ECG289A | SK3849 |
| Q910, 11 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q912, 13 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
| | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
| | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| Q914 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| Q960 | RN1204 | A6002040 | NTE2359 | ECG2359 | SK9959 |
| Q961 | RN2202 | A6012020 | NTE2356 | ECG2356 | SK9958 |
| Q962 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| QA01 | M37274MA-051 | - | - | - | - |
| | M37274MA-054 | 23902601 | - | - | - |
| QA02 | 24LC04BI/P | 23904942 | - | - | - |
| QB01 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| QB03 | RN1205 | A6002050 | - | - | - |
| QB22 | 2SC725(G)TM-Y | A6734590 | NTE289A | ECG289A | SK3124A |
| QB23, 30, 40 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| QB60 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
| | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
| | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| QB61 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| QB63 | RN1206 | A6002060 | - | - | - |
| QD80 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
| | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
| | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| QG60 | BA10358 | 23904303 | NTE928M | ECG928M | - |
| QG61 | UPC1406HA | 23119228 | NTE1792 | ECG1792 | SK9877 |
| QV01 | MM1250XD | 23904747 | - | - | - |
| QV10 | MM1188XS | 23904300 | - | - | - |
| QV13 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |
| QV14 | 2SA933S-Q | 23114530 | NTE290A | ECG290A | SK9132 |
| | 2SA564A-Q,TH | - | NTE290A | ECG290A | SK3932 |
| | 2SA1015Y | - | NTE290A | ECG290A | SK9132 |
| QY01 | TA1270F | - | - | - | - |
| QY02 | 74HC04A | - | - | - | - |
| | TC74HC04AF | - | - | - | - |
| QY03 | TC9083F | - | - | - | - |
| QY10 | 2SA1162Y | - | NTE2409 | ECG2409 | SK10100 |
| QY26 | 2SA1037K | - | NTE2409 | ECG2409 | SK10100 |
| | 2SA1162Y | - | NTE2409 | ECG2409 | SK10100 |
| | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| QY27, 29, 30 | 2SC2412K | - | NTE2408 | ECG2408 | SK10099 |
| | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| QY31 | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| QY35, 36 | 2SA1162Y | - | NTE2409 | ECG2409 | SK10100 |

## SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

| Item No. | Type No. | Mfr. Part No. | NTE Part No. | ECG Part No. | TCE Part No. |
|---|---|---|---|---|---|
| QY39 | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| QY40, 41 | 2SC2712Y | - | NTE2408 | ECG2408 | SK10099 |
| QY43 | 2SC3437 | - | - | - | - |
| QY101 | 2SA1162Y | - | NTE2409 | ECG2409 | SK10100 |
| QZ01 | TC90A15P | B0410810 | - | - | - |
| QZ02, 03, 04 | 2SC1740S-Q | 23114528 | NTE85 | ECG85 | SK3122 |
| | 2SC1685Q,TH | - | NTE85 | ECG85 | SK9229 |
| | 2SC1815Y | - | NTE85 | ECG85 | SK3124A |

## CONTROLS & RESISTORS

| | Item No. | Function/Rating | Mfr. Part No. | NTE Part No. |
|---|---|---|---|---|
| | R416 | 6800 5% 5W Wirewound | 24510682 | 5W268 |
| | R416 (1) | 5600 5% 5W Wirewound | 24019335 | 5W256 |
| | R424 | 1 5% 1/2W Fusible | 24546109 | - |
| | R441 | 1000 5% 1W Fusible | 24532102 | F1W210 |
| | R462 | 15 5% 1/2W Fusible | 24000211 | - |
| # | **R475** | 390 5% | 24366391 | - |
| # | **R478** | 13K 1% 1/4W | 24327133 | - |
| # | **R482** | 4700 1% 1/4W | 24327472 | - |
| | R488, 89 | 18K 1% 1/4W | 24327183 | - |
| # | **R743** | 220 5% 2W | 24554221 | 2W122 |
| | R808 | 7/233 Cold PTC | 24000862 | - |
| | R810 | 1.1 5% 15W Wirewound | 24007873 | - |
| | R898 | .39 1/2W Fusible | 24546398 | - |
| | R920 | 5.1 5% 1W Fusible | 24000880 | F1W5D1 |
| | R920 (1) | 2.2 5% 1W Fusible | 24000961 | F1W2D2 |
| | R984 | 1500 2% 1/8W | 24367152 | EW215 |
| | R985 | 470 2% 1/8W | 24367471 | EW147 |
| | R986, 87 | 680 2% 1/8W | 24367681 | EW168 |
| | R988, 89 | 4700 2% 1/8W | 24367472 | EW247 |
| | R991 | 680 2% 1/8W | 24367681 | EW168 |

**# For SAFETY use only equivalent replacement part.**
(1) Used in model CN36G95.

Created with pride by the employees
of Howard W. Sams & Company.

*J. Barker, N. Beck, B. Buchanan,
T. Clensy, G. Farrell, B. Fink,
M. Herkless, J. Kocha, F. Malek,
B. Medaris, R. Raus, B. Skinner*

## CABINET PARTS

| Item | Mfr. Part No. |
|---|---|
| **Model CN32G90** | |
| Button Control | 23444983 |
| Button Power | 23444982 |
| Cabinet Front | 23510185 |
| Cabinet Rear | 23426481 |
| Window Remote | 23430303 |
| **Model CN36G95** | |
| Button Control | 23444881 |
| Button Power | 23444880 |
| Cabinet Front | 23510233 |
| Cabinet Rear | 23426761 |
| Window Remote | 23430300 |

# PARTS LIST continued

## CAPACITORS & ELECTROLYTICS

| | Item No. | Rating | Mfr. Part No. |
|---|---|---|---|
| # | **C440** | .0078 3% 1.5kV | 24082958 |
| # | **C440** (1) | .0082 3% 1.5kV | 24082959 |
| # | **C442** | .39 315V | 24082920 |
| # | **C444** | .0062 3% 1.8kV | 24082611 |
| # | **C444** (1) | .0056 3% 1.8kV | 24082837 |
| # | **C467** | .018 3% 630V | 24095881 |
| # | **C467** (1) | .015 3% 630V | 24095883 |
| | C476 | .01 3% 630V | 24095887 |
| | C505 | 12pF NPO | 24353120 |
| # | **C801** | .22 20% 125VAC | 24095670 |
| | C802 | .082 20% 125VAC | 24095852 |
| | C805, 06 | .01 +80% -20% 250VAC | 24092300 |
| | C811, 12 | .0047 20% 250VAC | 24092585 |
| | C813, 14 | .01 20% 250VAC | 24092586 |
| | C865, 71 | .0015 10% 2kV | 24092347 |
| | C893, 94 | 270pF 10% 2kV | 24092338 |
| | C902 | .001 10% 2kV | 24092345 |
| | CB60 | 2.2µF 20% 50V NP | 24085944 |
| | CG67 | 10µF 20% 16V NP | 24085981 |
| | CV13 | .47µF 20% 50V NP | 24085973 |

**# For SAFETY use only equivalent replacement part.**
(1) Used in model CN36G95.

## COILS & TRANSFORMERS

| | Item No. | Function/Rating | Mfr. Part No. |
|---|---|---|---|
| | G103 | - | 23238704 |
| | G104 | - | 23289470 |
| | G500 | - | 23289100 |
| | G890, 91 | - | 23280016 |
| | L101 | - | 23289101 |
| | L111, 112 | - | 23238562 |
| | L113 | - | 23289220 |
| | L301 | Ferrite Bead | 23103859 |
| | L400 | - | 23238714 |
| # | **L441** | Horizontal Linearity | 23233941 |
| # | **L441** (1) | Horizontal Linearity | 23233953 |
| | L442 | - | 23248122 |
| # | **L461** | - | 23248115 |
| # | **L461** (1) | - | 23248179 |
| # | **L462** (3) | Yoke Horiz 1.3mH<br>Vert 18.3mH | - |
| | L463 | Ferrite Bead | 23103859 |
| | L501 | - | 23289101 |
| | L502 | - | 23289470 |
| | L702 | Ferrite Bead | 23261974 |
| | L704, 05 | Ferrite Bead | 23103859 |
| | L805 | - | 23248150 |
| | L806 | - | 23221747 |
| | L861, 62 | Ferrite Bead | 23103880 |
| | L883, 84 | Ferrite Bead | 23103880 |
| | L885 | - | 23248073 |
| | L886, 88 | Ferrite Bead | 23103880 |
| | L901 | Degaussing | 23200631 |
| | L901 (1) | Degaussing | 23200200 |
| | L902, 03, 04 | - | 23289221 |
| | L910 | - | 23237991 |
| | LA01 | - | 23289100 |
| | LB01 | - | 23262261 |
| | LM18 | - | 23289100 |
| | LV01 | - | 23289220 |
| | LZ01 | - | 23238708 |
| | LZ02 | Ferrite Bead | 23103880 |
| | LZ03 | - | 23238714 |
| | LZ04 | Ferrite Bead | 23103880 |
| | LZ05 | - | 23289100 |
| | T401 | Horizontal Drive | 23224367 |
| | T401 (1) | Horizontal Drive | 23224336 |
| | T461 (2) | Horizontal Output | 23236485 |
| | T461 (1)(2) | Horizontal Output | 23236514 |
| | T801 | Line Filter | 23211671 |
| | T840 | Power | 23213513 |
| | T862 | Converter | 23217379 |

**# For SAFETY use only equivalent replacement part.**
(1) Used in model CN36G95.
(2) Focus and screen controls are part of T461.
(3) Yoke is bonded part of CRT.

## MISCELLANEOUS

| | Item No. | Description | Mfr. Part No. | Notes |
|---|---|---|---|---|
| | F301 | Fuse | 23144908 | .5 Amp, 125V, Fast Acting |
| | F301A | Fuse Holder | 23165433 | 2 Used |
| | F470 | Fuse | 23144731 | 1.6Amp, 250V, Fast Acting |
| | F470A | Fuse Holder | 23165433 | 2 Used |
| | F801 | Fuse | 23144888 | 5Amp, 125V, Slow Blow |
| | F801A | Fuse Holder | 23165433 | 2 Used |
| | F860 | Fuse | 23144511 | 4Amp, 125V |
| | H001 (1) | Tuner | 23321231 | Main, ELA12LX1 |
| | H002 | Module | 23148271 | IF/MTS/A.PRO, MVUS33S |
| | H003 | Switch | 23344398 | RF, RSU133X3 |
| # | **HY01** (1) | Tuner | 23321263 | PIP, EL924L2 |
| | K912 | Transmitter | 23306230 | Remote, CT-9905 |
| | KB01 | Receiver | 23905177 | Remote, PIC-TB16 |
| | P801 | Line Cord | 23176005 | AC, Polarized |
| | PV01 | Jack | - | SVHS |
| | PV03 | Jack | 23365840 | Assembly |
| | SA01 | Switch | 23145227 | Channel Up |
| | SA01 (2) | Switch | 23145226 | Channel Up |
| | SA02 | Switch | 23145227 | Channel Down |
| | SA02 (2) | Switch | 23145226 | Channel Down |
| | SA03 | Switch | 23145227 | Volume Up |
| | SA03 (2) | Switch | 23145226 | Volume Up |
| | SA04 | Switch | 23145227 | Volume Down |
| | SA04 (2) | Switch | 23145226 | Volume Down |
| | SA05 | Switch | 23145227 | Video |
| | SA05 (2) | Switch | 23145226 | Video |
| | SA06 | Switch | 23145227 | Menu |
| | SA06 (2) | Switch | 23145226 | Menu |
| | SA07 | Switch | 23145227 | Power |
| | SR81 | Relay | 23146564 | Power |
| | U901 | PC Board | - | CRT, PB7347A |
| | U901 | PC Board (2) | - | CRT, PB7347B |
| | U902 | PC Board | - | Main, PB7164C |
| | U902 | PC Board (2) | - | Main, PB7164D |
| | U910 | PC Board | - | TIF/PIP, PB7166-1 |
| | UA01 | PC Board (2) | - | Control, PB7168 |
| | UA02 | PC Board (2) | - | RMT/LED, PB7166-2 |
| # | **V901** | CRT | 23312690 | A81AGZ50X01V |
| # | **V901** (2) | CRT | 23312713 | A90AHH50X02V |
| # | **V901A** | Socket | 23902068 | CRT |
| | W661 | Speaker | 23351088 | 2 1/4" X 5", 8 Ohm, 5W |
| | W661 (2) | Speaker | 23351258 | 8 Ohm |
| | W662 | Speaker | 23351088 | 2 1/4" X 5", 8 Ohm, 5W |
| | W662 (2) | Speaker | 23351258 | 8 Ohm |
| | X401 | Crystal | 23153721 | 503kHz |
| | X501 | Crystal | 23153961 | 3.58MHz |
| | XA01 | Crystal | 23153325 | 8.0MHz |
| | ZY01 | Module | 23148278 | PIP, PMUS08H |

**# For SAFETY use only equivalent replacement part.**
(1) Contact TNI Electronics for replacement; order by part number on tuner.
(2) Used in model CN36G95.